The Builder.

VOL. L. No. 2230. SATURDAY, MARCH 20, 1886

ILLUSTRATIONS.

New Examination Halls for the Royal Colleges of Physicians and Surgeons, on the Thames Embankment.—Mr. S. Salter, Architect ... 440-441
Birmingham Law Courts Competition.—Sketch Design submitted by Mr. J. P. Seddon and Mr. J. Coates Carter, Architects ... 444-445
Birmingham Law Courts Competition.—Sketch Design submitted by Mr. H. H. Statham, Architect ... 448-449
Views of Compton Winyates, Warwickshire: Illustrations to a Paper on "Architectural Photography by Amateurs" ... 452-453

CONTENTS.

Worth's "History of Devonshire" ... 429
The New Railway Bill ... 430
Notes ... 430
Architectural Drawings at the Royal Scottish Academy ... 432
Concrete ... 433
Royal Institute of British Architects: Some American Methods of Construction ... 434
Architectural Photographs by Amateurs ... 436
Examination Hall for the Colleges of Physicians and Surgeons ... 438
Birmingham Assize Courts: Sketch Competition Designs ... 438
Compton Winyates ... 438
Free Lectures to Artisans at Carpenters' Hall: The Architecture of City Buildings ... 456
Architectural Societies ... 457
The Disposal of the Metropolitan Sewage ... 457
Architectural Association Visits ... 458
Proposed United Arts Club ... 458
Sewer Ventilatton ... 468
The Student's Column: Our Building Stones.—II. ... 459
Recent Patents ... 459
Recent Sales of Property ... 459
Meetings ... 460
Miscellanea ... 460
Prices Current of Building Materials ... 460

Worth's "History of Devonshire."

NEW classes of publication are so entertaining as a county history,—so comprehensive, so various, embracing every subject that can interest reasonable man,—history, religion, politics, war, science, art, literature, folk-lore, superstition, and touching lightly upon all. The dear old folios of our learned forefathers, with their sweet credulity, their appetite for the marvellous, their complacent garrulity about trifles, their vehement patriotism and loyalty, and their ever-ready explanations of the inexplicable, have delighted generations of readers. Even now, in its modern and mutilated form, shorn of its peculiar charms, and filtered through the fine sieve of a sceptical generation, the county history holds a high place in our affections. With what a wide charity does it admit all subjects within its hospitable covers! How truly catholic is its range,—a vast trajectory, an infinite curve, reaching from yesterday to the "first syllable of recorded time" and beyond, to epochs glacial, inter-glacial, pre-glacial, too remote for the companionship of the halting imagination. British, Roman, Saxon, Danish, Norman hosts, in vast processions, pass by in melancholy pomp; and warriors, in quick succession, cross the historic stage like the phantom kings in Macbeth's vision. The ravages of war, the triumphs of peace, alternately alarm and elate us as we follow the chequered record. Deeds of personal prowess stir our chivalrous sympathies. The wit and wisdom of twenty generations are, for our edification, crystallised into proverbs. The chant of the monk, the cry of the poor, and the sighs of hapless lovers, are audible in every page, and over all alike death, "pallid death," writes the inexorable doom. It is a book for every mood, and all occasions of study or leisure, yielding a generous return for invested time. The author is independent of rule and restriction. He may linger lovingly over his subject and present it to us with elaborate care, or pass swiftly from point to point "with the motion of a pewterer's hammer." The abruptness of his transitions does but give briskness to his narrative. He always has, moreover, the most interesting of all the counties as the field of his peculiar labours. In the present case* he deals with one which is "all but the largest in the kingdom, which has afforded the earliest traces of man in these islands; which has never, from the dawn of recorded history, occupied a secondary place in the national life; which again and again in the hour of England's need has found the man" (who surely ought to be rewarded with a capital M); "whose worthies century by century claim the first rank in *every* class,—soldiers, sailors, lawyers, divines, inventors, poets, artists, explorers, statesmen, men of science. . . . the history of such a county is the history of England," &c., &c. This is the true temper of your county historian; let us see how the author of this history of Devonshire, the land of deep valleys, has acquitted himself. In the first place, his book is without a map, and this we take to be an inexcusable fault. We will waive the time-honoured engravings of the "principal seats," the coats of arms, remarkable inscriptions, &c., not without a sigh; but a map is absolutely essential to a well-regulated county history. Failing that, we should at least have such a description of the county as would enable the reader mentally to supply the omission. We are not possessed by any morbid craving for mere statistics; but we feel that we have a right to know the area of the district dealt with, its population, soil, main divisions, length of seaboard, its maritime and topographical features, &c., all of which might have been projected in a word-picture if not on a map. The flora, if not the fauna, of Devonshire, should certainly have a chapter to itself. The author has after much deliberation elected for an order "mainly topographical," taking separately such prominent places as Exeter, Plymouth, Tavistock, Crediton, and treating in separate sections of the history and peculiarities of each. In other words, his is not a history of the county as a whole, but of the individual lives of the chief places in it. The narrative loses in breadth and continuity by this treatment, which, moreover, involves a great amount of otherwise avoidable repetition. The whole work suffers somewhat from this fragmentary method of dealing with the subject. The architecture of the county, to wit, is not presented at one view, but in isolated references to individual examples, and those who desire to obtain a general idea of the special characteristics which differentiate the architecture of our principal western county will not find it in the present history. But they will pick up a good deal of desultory information on that and many other subjects,—stray facts about geology, genealogy, climate, historical vicissitudes, local customs, place-names, interspersed with biographical notices of famous Devonians of all times and conditions, from Ælfred,—if, indeed, he were a Devonshire man,—to Sir John Bowring. The first and last chapters depart, however, from the general scheme: one gives in a connected form the early history of Devonshire, and the other its dialect and folk-lore; and these will, we venture to think, be read with greater interest than any of the others. The prominent facts connected with the early history of the county are its very partial occupation by the Romans, only one Roman station of note,—to wit, Exeter,—being within its confines; and the peaceful colonisation of the county by the Saxons who "annexed" it without conquering it, and finally ousted the Keltic population cuckoo-fashion, driving them westward, and re-settling the evacuated country somewhere between the year 710 and 823. "The constitution of Devon is," says Mr. Worth, "purely Saxon. Each of its hundreds has a Saxon name, and each of its municipalities originated in a Saxon community."

In the chapter on dialect and folk-lore the Devonshire speech is claimed to be "the true Classic English. The English of Alfred's time is the groundwork of modern English; in his day it was the polite, the courtly, the literary, in fact, the standard form of speech; and Alfred, a West countryman, spoke *most likely* in Devonshire style." Until 1100 the language of Alfred, or Ælfred, remained the only written English. It was to the accident that the great writers of the fourteenth century, the first to have their writings disseminated by the newly-invented printing-press, were Midland men that the fixed or book language varied from that of the Saxon king, Chaucer's "well of English undefiled" not having the true antique savour. Some compensation for the wrong thus done to the Western dialect was made when the heroes of Elizabeth's reign,—mostly West countrymen,—brought their local dialect to the court and again made it fashionable, "making its rugged sounds dear to all who valued stoutness of heart, and especially to the great queen herself." It appears to have been always the fact that in the really Classic English of Devonshire "everything is *he* except a Tom-cat, and that is a *she*." The true native dialect is now most marked in the Dartmoor district, although it may still be heard in Exeter; but along the Tamar it has been adulterated with Cornish idioms, and Plymouth, "the Cornishman's London," has further sophisticated the current speech by an alien Irish element. The etymology of the Devonshire place names is particularly interesting, and must be followed by the curious reader in the book itself. Superstition has maintained a stronghold in the West, living animals having within memory been burned alive to avert the loss of others; puppies are still buried in a

* A History of Devonshire, with Sketches of its Leading Worthies. By R. N. Worth, F.G.S., &c. London: Elliot Stock. 1886.

field to cleanse it of weeds; toads are cruelly destroyed as emissaries of Satan; and the sun is firmly believed to dance on Easter morning. Sir Francis Drake, the foremost of Devon's worthies, is reputed to have worked by magic, firing a cannon-ball through the earth to prevent his wife committing bigamy; and it is still believed that if you have the courage to call him by beat of his old drum he will promptly obey the call.

As usual, sad stories of the cruelties practised upon old women who were reputed witches re-appear,—the last execution of the kind but one in the kingdom taking place at Bideford in 1682; and the tragedy is darkened by the fact that the poor creatures almost invariably confessed their guilt, and gave circumstantial accounts of the devil's appearance to them "as a gentleman," "a lyon," and so forth. Three of the most "old, decrepit, despicable, miserable creatures" that an eye-witness ever saw were hanged at Exeter as a consequence of their own confessions against themselves in 1695. And it is humiliating to find that, although the cruel laws against witchcraft have been repealed, and a poor woman may now be old and ugly without being hanged or burned for it, the belief in witches and their powers for evil is still strong in the West.

A large part of the work is naturally taken up with incidents connected with the civil wars and the Rebellion; and in those troublous times, by one misadventure and another, the old halls and mansions, which were numerous in the county, were either wholly destroyed or irremediably ruined.

They are not described at such a length as we could desire; but although little is said about them, they are evidently touched upon with competent knowledge of their characteristics, dates, and their proper places in the annals of our domestic art. Ford Abbey, a remarkable example of monastic building adapted to domestic wants, partly, it is said, by Inigo Jones, and fresh in the memory of every one who has seen it, lovely in its partial decay, from the banks of the beautiful river Axe, has a little more attention bestowed upon it; but, as a rule, a sort of hasty guide-book reference is all that the author can afford.

With the anecdotes connected with the history of each town, the personal gossip, the local worthies, the strange customs, the survival of otherwise obsolete forms of land tenure, and the multitude of interesting facts bearing generally upon the county and its doings from time immemorial, we have no space to deal. We have much to thank the author for; but from our own particular point of view much is wanting to make his history perfect. It may be read as a critical commentary on earlier folios; but though it may usefully correct them in points wherein they were misdirected, it cannot be accepted entirely in substitution of those delightful, though perhaps desultory and somewhat inaccurate, treatises.

THE NEW RAILWAY BILL.

THE measure just introduced by Mr. Mundella dealing with railway and canal traffic is a bold and honest attempt to grapple with a question of great complexity and difficulty. This was recognised by all parties in the House, and the right hon. gentleman's effort is evidently better appreciated than any previous attempt in this direction. Of course, he had the benefit of the experience of his predecessors (which he acknowledged most fully), and, moreover, was aware of the objectionable features in previous measures which rendered them unacceptable. There is very much in the Bill that was to be found in that prepared by Mr. Chamberlain in 1884. Indeed, some points that provoked the greatest opposition on that occasion are incorporated here, though in a somewhat different form. Some are based upon the Reports of the different Committees which have from time to time investigated the subject; while in others,—in spite of the statement of Mr. Jefferds, C.E., quoted in our "Notes" of the 6th inst., that the opinions of Americans on such matters are unheeded on account of prejudice,—Mr. Mundella admits that he is following precedents set by the legislation of the United States.

The first part of the Bill deals with the Railway Commission. The functions of this body were treated of at length in our issue of May 23rd last, when it was remarked that it had proved itself of sufficient value to be constituted a permanent tribunal. We are glad to see that this is provided for by the Bill, the Commission being made a permanent Court of Record. It is to be further strengthened by the appointment of a Judge of the High Court as Chief Commissioner. Although the general opinion of the House was that the judgments of the Commissioners had given satisfaction, Sir J. Pease complained that in some cases they had acted weakly. That some of their decisions have not been effective is due more to their uncertain tenure of office, and the liability of their decisions to reversal, than to any lack of ability to appreciate and adjudicate upon the causes brought before them. With a Judge as President, however, the decisions of the Court will have a force which should have the effect of precluding appeal, and thus simplifying the cases brought before it. Indeed, no appeal will be allowed except upon questions of law. Mr. Mundella hopes, however, to introduce a system of arbitration by which litigation may be, to a great extent, avoided. The proposal is to empower the Board of Trade to receive complaints from persons who consider that they are being treated in an oppressive or unreasonable manner, and, if they think there is reasonable ground for complaint, to call upon the railway company for an explanation. A competent person is to be appointed to confer with the complainants and the railway company, and endeavour to arrange an amicable settlement. Reports of such proceedings, with observations thereon, are to be submitted to Parliament, and would furnish valuable aid for further legislation. This idea is borrowed from the Americans, who have found it answer admirably. The publicity thus given to different complaints and to the arguments on both sides must be very useful to the public as well as to Parliament, and the system is guarded against abuse by the imposition of a small fee on receiving complaints. Sir R. Webster, while agreeing with the principle of negotiation, where practicable, expressed a certain amount of scepticism as to the probable efficacy of this arrangement; but, to the legal mind, perhaps, arbitration does not so readily commend itself as to others. Another useful provision is that giving a *locus standi* to councils, chambers, associations, &c. This clause is most comprehensive and valuable, especially as the decision of the Commissioners on this point allows of no appeal, and public bodies are allowed to apply corporate funds to any expense incurred in bringing cases before the Court.

The most important clause is that dealing with the rates and charges. It requires every railway company, within twelve months from the commencement of the Act, to submit to the Board of Trade revised specifications and schedules of their maximum rates and charges. Mr. Mundella showed that the Act of 1845 gave the House the right to demand this, and to exercise control over the rates, and impose such conditions as it may consider desirable. To meet the "terminals" difficulty,—the rock upon which so many attempts to settle the railway rate question has split,—it is provided that where such charges are proposed to be made, the circumstances and nature of the charge are to be fully stated. The Board of Trade will make the new classification and schedules public, and receive representations from any parties against the proposals. The Department will then undertake their final revision, and submit them to the House. Most of the railway companies have such classifications and schedules already prepared, and we may take it for granted that they will re-introduce those which the House declined to consider last year. The present measure is so far on the lines of that prepared by Mr. Chamberlain that it throws upon the companies the onus of bringing forward new classifications, &c., but, whereas he would refer them to the Railway Commissioners for revision, Mr. Mundella considers that the Board of Trade ought to undertake this work. Again, Mr. Chamberlain's plan for dealing with the terminals was to insert a clause worded as follows:—"It shall be lawful for a railway company to charge a reasonable sum for such terminal, subject, in case of dispute, to the sanction of the Commissioners who may prescribe the manner in which the scale of such terminals shall be published." Although it was further provided that "the provisions of this clause as to terminals shall not apply to any railway company until their revised classification and rates have been approved by Parliament," the traders naturally took fright at the indefinite power which (subject to costly appeal) the companies would thus possess with regard to terminals. In the present case they must first show that they may reasonably claim them, and give all details and particulars, and then take the decision of Parliament. There is plenty of time given for the preparation of these particulars, for the twelve months' grace dates from the 1st of October next.

The burning question of undue preference is dealt with as follows:—On proof of inequality in charges the burden of showing that it does not constitute any undue preference shall lie upon the railway company. The question is to be decided by the Commissioners, and they are to have power to take into consideration whether reduced charges are necessary for the purpose of securing the traffic in respect of which they are made. This is in recognition of the principle enunciated by the Committees of 1867 and 1872, who came to the conclusion that it is impossible to draw a hard-and-fast line as to equality in charges, as special circumstances frequently call for special rates, which do not operate to the prejudice of any person or class. Of course, if such prejudice is shown to result from this practice it will not be allowed to continue. It is quite as impracticable to make equal mileage rates binding under all circumstances, and it is provided that the companies may charge "group" rates where it is found desirable. In this also the rights of the public are safe-guarded, for it will not be allowed where it would favour any particular person to the prejudice of another.

The remaining provisions of the Bill deal with statistics, methods of proceeding, definitions of terms, &c., and are of little public interest. As Mr. Mundella stated, it appeared that many of the grievances to which such prominence has recently been given could have been remedied by existing Acts, while others (as we recently took occasion to remark) could not be substantiated; but the present measure aims at simplifying proceedings by defining more clearly the rights and powers of the companies. The favourable reception given to the first reading of this Bill augurs well for its success, though there will doubtless be objections raised to some of its provisions when it is considered in detail. A thoroughly satisfactory solution of the many vexed questions involved cannot be looked for in a single measure, but it seems calculated to do much towards settling some of the most pressing of them.

NOTES.

THE rejection of the vote of 50,000*l.* odd by the House of Commons last week for the maintenance of the London Parks leaves them at present without any fund. This will, it seems, be met by a Bill handing the control over to the Metropolitan Board of Works of those which are not so-called Royal Parks, and enacting that the cost shall be defrayed from the rates, and obtaining a fresh vote for the Royal Parks. In theory there can be no doubt that London should pay for its own parks; there is no more reason why the country at large should pay for Battersea Park than for Sefton Park, at Liverpool. On the other hand, it must be admitted that the Metropolitan Board of Works have quite sufficient on their hands at present without the London

parks being added, and the ratepayers have far too little direct control over the expenditure of the Metropolitan Board of Works for it to be altogether satisfactory to see them entrusted with the collection and expenditure of the park funds. However, the House of Commons have so bid, and there is no more to be done except for Londoners to take care that whatever body looks after its parks in future they shall at once be watched over with care and intelligence and without extravagance as well as without cheeseparing.

THE Metropolitan Board of Works cannot justly be accused of undue haste in their procedures for defecating the Thames. The treatment of 9,000,000 gallons a day, for which one of the reservoirs at Crossness is to be set aside, is, no doubt, an experiment on a large scale. But as far as the pollution of the river is concerned, the result of this treatment, supposing its success to be perfect, will only reduce the daily contamination by less than 6½ per cent. Further, assuming the satisfactory treatment of the 9,000,000 daily gallons, for which the sum of 8,000*l.* is allotted, to be such as to lead to the application of the same process to the 140,000,000 gallons of daily flow of sewage, the proportionate cost will be 125,000*l.* a year. Nor is this all. The Works and General Purposes Committee report with great truth that the dealing with the "sludge" is a matter of difficulty, because of the enormous volume of London sewage. If this product be formed at the same rate, in proportion to the volume of sewage, that obtains at Birmingham, it will amount to upwards of 4,000 tons a day. And the daily volume of the sewage is increasing by about 2½ million gallons per year. When we are told, with regard to this prodigious mass of semi-fluid, that "it could be pressed and burned or otherwise disposed of," and that "there is every reason to believe that by the admixture of chemicals it would be deodorised, and the offensive appearance removed," it is clear that little is as yet certain except heavy cost. To redeem the Thames from the condition of a common sewer is, no doubt, an imperative necessity. But if this is done, as now appears to be contemplated, by the manufacture of a million and a half tons of sludge per annum, it may well be thought that the unfortunate experimenters are somewhere "between the devil and the deep sea."

THE debate on the taxation of ground-rents in the House of Commons on Tuesday last was not a particularly business-like performance. There was a general consensus of opinion that the ground landlord at present is improperly exempt from local burdens, and there was a good deal of wild talk. But no attempt was made to show how the ground landlord is to be rated, and but a very feeble effort was made to the objection that if in future the landlord is rated he will ultimately make the occupier pay by extracting a higher rent. Mr. Moulton, who seconded the motion, in answering the objection merely said that "it was impossible any increase of taxation could be got out of the pockets of his tenants." But when land is limited in extent in those places where it is in request, people are obliged to pay current prices, and if in future ground landlords add to their rents the amount at which they are rated it necessarily follows that tenants must pay these increased rents. It may be that the Select Committee to which the question has been referred will find some way of dealing with the subject so that ground landlords and occupiers shall bear a more equal share of local burdens than is at present the case. Meanwhile, it is necessary to admit that though the taxation of ground-rents is desirable in principle it is not easy to reduce it to a practical form.

IT is to be hoped that the question of labour statistics raised a short time ago by Mr. Bradlaugh will not altogether be allowed to drop, for there can be no doubt but that an institution which laid itself out to give this kind of information would be of far greater benefit than would appear at first sight. The fact that so many countries have adopted the system, more or less completely, is sufficient to show its practical utility, and it needs but little acquaintance with working-class affairs to see what a vast amount of knowledge might be brought to bear upon our own artisans. None are so insular as English operatives, or so firmly persuaded that they can do better work than those of any other nation; and it would be an admirable lesson if they could be made to see for themselves that the standard of perfection is approached much more nearly on the Continent than they appear to be aware; that Continental workpeople are contented to labour for much longer hours at a greatly lessened rate of pay; that much of the Continental, and all the American, machinery is as good, if not better, than our own; and that, in short, the English artisan has an incomparably easier time of it than most of his fellows abroad. The truth is that a good many of the difficulties that exist in labour matters are brought about by the workmen themselves; and if we examine dispassionately the past history of English labour it will be painfully evident how much loss of handicraft has been due to the men's intolerant and ill-advised haste in rectifying their supposed wrongs by strikes. The questions of emigration and plethora of labour are both of the last importance; and a well-devised organisation by which information on these points could be kept daily before all those who were interested, would be a wonderful smoother of differences, both for masters and men. In default of such, the latter naturally fall an easy prey to the agitators, who make it their business to tell just as much or as little as may suit their purpose; or, in other words, to instruct their hearers in the way that is best suited to set class against class.

THE Metropolitan Board of Works have incurred the displeasure of the theatrical and music-hall managers in respect of the duty imposed upon them with reference to the inspection of theatres. It is only right to say that this duty, so necessary in the interests of the public safety, was not sought by the Board, but was forced upon them by the Select Committee on the Fire Brigade appointed in 1877. This Committee was originally deputed to inquire into the working of the Metropolitan Fire Brigade, but its scope was extended to include means available for preventing loss of life in theatres, and a great deal of evidence was taken upon this latter subject. The Committee reported "that no new theatre or large music-hall in the metropolis should be finally licensed until certified that in respect of position and structure it satisfies all due requirements for the protection against danger from fire [*sic* in original], and that the Metropolitan Board should be the certifying authority. That with respect to existing theatres and halls, the Metropolitan Board should have power to call upon the proprietors to remedy such structural defects as appear to the Board to be the cause of special danger, and to admit of being remedied by a moderate expenditure, option being allowed to the proprietors to refer the whole question to arbitration." In the ensuing session of Parliament the Board introduced a Bill giving effect to the recommendations of the Committee, and this Bill became law as "The Metropolis Management and Building Act Amendment Act, 1878." The Committee further recommended that the Lord Chamberlain and the Justices should make regulations for the management of theatres and music-halls, but no such regulations have been made. By a Bill now before Parliament, however, and of which the second reading was moved by Mr. E. Rider Cook on Wednesday, the Board are, at the instance of the Lord Chamberlain and the Home Office, seeking powers to make such further regulations as may be necessary for the safety of the public. Of course "vested interests" are up in arms at the proposal, but the figures cited by Mr. Cook as to the condition of things prevailing before the Board looked into the matter are the best evidence of the necessity of some effective controlling power. To quote only one set of figures, the Board, according to Mr. Cook, found that forty-one theatres had, between them, only forty-two staircases and fifty-seven exits.

THE Vestry of Chelsea have issued a report on the recommendations of the Metropolitan Board of Works as to the cleansing and ventilation of sewers, which contains some very practical criticism. Among points in it we note that the Vestry consider the proposal to prohibit trade establishments, such as breweries, from sending hot water into the sewers, "would practically amount to a prohibition of the trade." In regard to flushing, they calculate that to daily flush the sewers of their district with any practical effect would require a minimum of 6,000,000 gallons per day. The recommendation that householders might be induced to flush the drains simultaneously at a stated time they dispose of, as we did, by saying that it is vain to expect to be able to compel such a united action. A by-law to that effect could not be enforced, and would only be attended to by a few of the wealthier residents. The same argument applies to the proposal that householders should deodorise (not "deoderise," gentlemen of the Vestry; consult your spelling-books) their sewage separately; they could not be compelled to do it, and the cost of deodorising piecemeal at so many points would amount to an enormous aggregate. On the question of street ventilators the Vestry do not commit themselves to any decided opinion; they seem rather desirous to disagree with no one. They conclude by the suggestion that "it would be advisable for the Vestry to request the Metropolitan Board of Works to place a sum of money at the disposal of its Special Purposes and Sanitary Committee, in order that they may by actual experiment and record of various systems of sewer ventilation be enabled to make such recommendations as will secure a solution of this very complex and difficult problem."

A CORRESPONDENT writes,—"As there appears to be an intention to propose building the new and larger House in one of the open courts adjacent to the present chamber, it is well to at once urge the objections to such a mistaken and retrograde act. In these days, the public voice demands proper sanitary arrangements in all buildings. Among these the provision of the means for the access of ample light and of pure air takes precedence. If the plan of the Select Committee of 1867, which has been ordered to be reprinted for the assistance of Members of Parliament in the consideration of this question, should be adopted and carried out, the excellent sanitary arrangements of the late Sir Charles Barry would be seriously interfered with, and I cannot imagine him, could he be consulted, sanctioning an act so damaging to his greatest architectural work. Of course, if a new House of Commons must be provided somewhere within the limits of the present Palace of the Legislature, local difficulties will of necessity create some disadvantages and inconveniences. The architect, whoever he may be, will not be working upon a *tabula rasa*. But I venture to think that the idea at the very outset of closing up open courts originally intended for the sole purpose of supplying light and air to a building of which they form a part, and which are not an inch too large for that purpose, is a bad one. To adopt it, even for so important an object as a new chamber, will be to begin upon a wrong principle and to invite future disappointment."

MR. J. HENRY MIDDLETON, M.A., Ex. Coll. Oxon, F.S.A., who has just been appointed to the Slade Professorship of Fine Art at Cambridge, is a son of the late Mr. John Middleton, F.R.I.B.A., of Cheltenham, and after leaving Sir Gilbert Scott's office, he was for some time in partnership with his father. Besides his architectural work, Mr. Middleton is known as a writer of authority on schools of painting, metal-work, pottery, mural decoration, ecclesiology, &c.; and articles on these and kindred subjects from his pen have appeared in the "Encyclopædia Britannica,"

and elsewhere, his latest and perhaps most important work being "Ancient Rome in 1885," published last year, and which we reviewed not long since. Mr. Middleton is at the present time the senior partner of the architectural firm of Middleton, Prothero, & Phillott, of Westminster, Cheltenham, and Newport, Monmouthshire.

AN influential local committee has been formed to promote a fund for placing the Atkins monuments recently re-discovered in St. Paul's, Clapham, in some conspicuous and fitting place, and the end of the north transept of St. Paul's Chapel has been spoken of. This place has the great advantage of being close to the original position of the monuments, being, in fact, but a few feet from the vault where they were found, and which is most probably below the position which they occupied in the former old parish church of Clapham. Still there are great drawbacks, from the fact that the space is contracted and dark, while the presence of a row of small windows, which may not be interfered with, effectually prevents the re-erection of the architectural portion of the tombs, of which there are ample data for very exact recovery of the original designs. It will be better to have the figures visible, rather than to be hidden from public view again, but still it will be matter for regret if the committee should be unable to carry out this important part of what is necessary, instead of merely refixing the monuments on bases containing the original inscriptions, but without the architectural canopies, as is now proposed. We gave a detailed description of the figures in the *Builder* on the 2nd of January last, p. 60. We are glad to hear that the suggestion, made originally in these pages, to take down the Hewer monument from the external wall of the church, where it is exposed to all weathers, and to refix it within the building, is likely to be carried out. We hope, too, that at the same time, the fragments of the monument of Bartholomew Clerke, Dean of Arches, which are actually in the heating-chamber, will also be brought into the church. These consist of two brass plates with inscriptions, and a single small kneeling figure, one of four which once adorned the monument, originally a characteristic composition of the time of Elizabeth.

DR. POLE'S letter on "Aërial Navigation," in the last number of *Nature*, is worth the attention of those who are interested in the subject. Dr. Pole is no visionary enthusiast, but one of the most clear-headed scientific men of the day, and he believes that the recent French experiments in balloon propulsion and steering, though only very partially successful so far, open up a distinct possibility of a future solution of the practical problem of air-ships.

IT is satisfactory to note that in spite of what has been said in some quarters as to the too severe demands made upon candidates for admission to Associateship of the Institute of Architects, in the conditions of the compulsory examination, no less than thirty-three candidates have applied for examination next week, and the Institute have had to make special provision to furnish accommodation for the candidates, by closing the Library to readers for three days next week. It is to be hoped the Institute may before long see its way to adopt Mr. Spiers's suggestion and acquire the Conduit-street galleries on the ground-floor for carrying on their increasing business.

THE exhibition of Mr. Holman Hunt's pictures at the room of the Fine Art Society has naturally attracted great public interest. It is impossible to look at this collection of works, showing immense labour and such serious purpose, without a regret that the artist's wonderful technical powers and unwearied labour are not supplemented by that *Je ne sais quoi* without which the breath of life cannot be breathed into a work of art. The sense of labour is never absent in looking at Mr. Hunt's work. Every detail is painted with the greatest care and minuteness, but seldom does the expression of the work touch one with any force proportionate to the labour bestowed on it. Among those which reach their mark nearer than the rest are the wonderful piece of coast landscape and sunshine in the "Strayed Sheep," and the landscape in the "Hireling Shepherd," which can be looked into in all its details almost like actual nature. These works make one doubt whether Mr. Hunt's proper calling was not landscape. "Isabella and the Pot of Basil" is a fine work, only marred by the fact that the Isabella is so unlike any possible girl of the period assigned to the story. So much for painting ideal characters unswervingly from a model. "The Awakened Conscience" is one of the figure-pictures that tells its story best and most directly. The "Light of the World" is one of the most remarkable pictures of its class, and has had a hold on the mind of the public such as the painter may well be proud of; but it is a work that will lose much of its hold when the kind of sentiment to which it appeals has passed away; and the same may be said of "The Shadow of Death," a much less complete and typical work, however. The "Light of the World," like Rossetti's poem "The Blessed Damozel," struck a new chord. The collection includes the "Scene from the 'Two Gentlemen of Verona'" (remarkable for the admirable portraying of Julia's anxiety at the impending discovery of her disguise); "Claudio and Isabella," in which Claudio looks quite mean enough for the proposal he made to his sister; a small duplicate of the "Christ and the Doctors," which is, perhaps, the artist's most successful work; and "The Scapegoat." The painter of these works will go down to posterity; but not in the first rank. Something is wanting. Genius has been described as "an infinite capacity for taking pains." Mr. Hunt's works give a decided negative to the definition. Painstaking almost amounting to genius is there; but it is not genius.

ARCHITECTURAL DRAWINGS AT THE ROYAL SCOTTISH ACADEMY.

WHILE there is no building of importance illustrated in this year's exhibition, the designs, although none of them displaying extraordinary ability, may be considered as fair specimens of the architectural outcome of the period.

Of designs for churches the most noteworthy is that of the Coats Memorial, at Paisley, by Mr. H. J. Blanc, which was successful in the competition, and which we fully described at the time. Mr. J. M. Dick Peddie submits an interior view of the chancel of St. Mary's Church, Haddington, restored. This church is of the same period, and probably designed by the same architect, as the later portions of St. Giles's, Edinburgh. It is, however, all of the one style, and is more graceful in its proportions and detail than the metropolitan example. The nave is still used as the parish church, but the chancel and transepts are in a state of utter ruin, and not likely ever to be restored as suggested by Mr. Peddie. The central tower (called "The Lamp of Lothian") when surmounted by its open crown, was probably the finest example of its kind. The church, which possesses a rich and characteristic west doorway, is illustrated in "Billing's Ecclesiastical Antiquities."

The front elevation of New Parish Church, Bo'ness, by R. Thornton Shiells & Thomson, showing a lofty broached spire in the centre, flanked by octagonal-ended transepts beyond, which appear square-ended transepts, has a dignified aspect, but is somewhat commonplace as regards detail. The "Selected Design for New Church" (place not stated), by James Fairley, appears as an attempt to give importance to a small church by giving it all the features which may possibly be found in one of considerable dimensions, a mode of procedure very apt to impose upon a committee uninformed as to such matters.

The new spire, St. Paul's Parish Church, Galashiels, designed by Messrs. Hay & Henderson, occupies its position in a worthy manner. It has sufficient bulk for dignity and enough detail for picturesqueness. Mr. Thomas Leadbetter's Parish Church, near Linlithgow, is a fair example of an Early English church with spire, aisles, and transepts, as conceived by a modern architect. Somewhat more pronounced is Mr. John A. Campbell's Free Church at Elie, Fifeshire, the spire of which is terminated by a small stone dome in a happy manner.

We have the usual contingent of mansions after the Scottish Baronial manner. Pitmedden, Aberdeenshire, has not suffered by the additions to it by Mr. Henry Wardrope, which show a thorough knowledge of the style. The House at Kilwinning, as designed by Mr. John James Burnet, is of a less ambitious type. The Tower of Lethendy, by Mr. Andrew Heiton, shows judicious selection and distribution of detail, and Kinlochmoidert, Invernesshire, by Mr. William Leiper, is equally felicitous, with rather more originality of treatment.

The latest phase of Scottish secular architecture is treated in a masterly manner by Mr. Sydney Mitchell, in the Hall at Well Court, Water of Leith. Well Court is a block of workmen's houses built for Mr. Findley of the *Scotsman*, and although quite new is a subject fit for the painter, both as regards composition and colour.

The central pavilion of the old Royal Infirmary of Edinburgh has been delineated in a worthy manner by R. Weir Schults. It was designed by William Adams in the beginning of last century, and was destroyed a short time ago. Its destruction seemed inevitable, but we are pleased to observe that our suggestion as to the utilising of the fine old gateway on another site has been carried into effect.

The Parish Hall and Presbytery-room, Hamilton, by Mr. G. Washington Brown, is a modest and satisfactory building of Queen Anne type without any vagaries.

The street architecture of the new town of Edinburgh, notorious for its monotony, is now being relieved by the introduction of gabled elevations. One has sprung up adjoining the new premises of the Bank of Scotland in George-street. It is a strongly-pronounced narrow front of Queen Anne type, with lanky columns supporting nothing.

At the west end of Princes-street a lofty tenement has sprung up, having double bulbous gables, and towards the eastern end of that street a space has been cleared, upon which is to be erected new premises for the Edinburgh Café Company. These premises, designed by Mr. H. J. Blanc, will form a marked feature in the line of street as seen from the Mound. The gable in this instance is bounded by straight lines, the flanks of the elevation are broad and solid, and in the centre, above the shop-front, a wide mullioned oriel is carried up through three stories, and a row of small square windows runs across at the springing of the gable. It is a most satisfactory manner of treating a narrow frontage. The Buccleuch Memorial and Science and Art School, Hawick, designed by Mr. James Fairley, jun., is a Classical structure upon a small scale, displaying a wealth of sculpture, which, if executed in a manner at all satisfactory, will form no inconsiderable item of the cost of carrying the design into execution. New Premises, South St. Andrew-street, Edinburgh, designed by Knox & Hutton, are just completed, and are effective in their way, but the style, a sort of Neo-Grec, is hard and unsympathetic. Mr. Hamilton Beattie's premiated design for the Edinburgh International Industrial Exhibition is of the accepted character of these glass and iron structures appropriated to such exhibitions. There is a dome, of course, and it is of a pleasing contour; the rest is ridge and furrow, appropriately treated.

Mr. John Le Conte makes a speciality of the architecture of Old Edinburgh, his drawing of the Canongate Tolbooth with Moray House, &c., contains two of the most remarkable façades in the Old Town. Mr. Ruskin pronounced the Tolbooth to be the finest thing remaining intact in the city.

Proposed New West Front to Milan Cathedral.—We recently announced that it was proposed to rebuild the western front of Milan Cathedral, and that an International competition would be held for the purpose of selecting designs. By the courtesy of Signor Magriglio, the Secretary of the Milan Institute of Architects, we are informed that the particulars of the competition are not yet ready, but it is expected that they will be published shortly, and so soon as we receive them we will lay a translation before our readers.

CONCRETE.*

I HAVE to-night to ask your attention to the means to be adopted for rendering buildings stable, and securing good foundations. This question of foundations is perhaps the most essential of any with which persons connected with buildings have to deal, for if the foundation be faulty, the superstructure, even if it should stand, will certainly suffer. It will be totally useless for the architect to design or for the deft fingers of the mason to elaborate the most delicate window-tracery, the most graceful piers and columns, the most stately towers and domes; or for the artist to enrich these creations with the most brilliant efforts of his genius, unless the edifice be founded so that no cracks or settlements occur to deface the decorations. In some localities, as, for instance, where rock crops up close to the surface, a natural foundation is obtainable which cannot be improved upon, but in the majority of cases, and especially in London and its neighbourhood, it is almost impossible to find a good natural foundation without digging to a depth that is practically out of the question on the ground of expense. Hence, it is necessary to form artificial foundations, and the material principally used for these is concrete.

Although the use of concrete as a building material is of comparatively recent date in this country, it was known and extensively used by many of the nations of antiquity. There is ground for thinking that the Greeks were not unacquainted with its use, especially in the Italian colonies of Magna Græcia, and, as far distant as Mexico, in many of those curious pyramidal buildings which are the remains of an unknown civilisation, concrete foundations have been discovered. But when we come to those grand old builders the Romans, who were, *par excellence*, the scientific constructors and engineers of ancient times, we find that they used concrete to an extent with which nothing that has as yet been done in modern times can compare. One reason for this was that the Romans found ready to their hand the best natural materials that exist in the whole world for making good concrete, viz., the Travertine limestone, the pozzolana, which is a fine sandy earth of volcanic origin, and a beautiful clean, sharp sand. The use of concrete by the Romans dates back as far as the time of the kings (*i.e.*, anterior to 509 B.C.), and no less than five kinds of concrete walls are described by Mr. Middleton, who has recently devoted a great deal of careful attention to the methods of construction of the Romans. In addition to using concrete for foundations they used it without any facing for walls, which were constructed very nearly as described in Mr. Tall's or Mr. Drake's patents, which were taken out a few years ago. Wooden posts were fixed in the ground about 3 ft. apart, and boards were nailed horizontally to the posts, and then the intermediate space was filled in with concrete in a semi-fluid state, and, as soon as this had set, the boards were moved one stage higher. Thus the concrete formed one perfectly solid mass, and some of these early Roman walls are so solid and hard still that quite recently it has been found necessary to destroy them with dynamite in the course of improvements that have been made. Even when the Roman walls appear to be of brick or marble this is in every case a mere facing or veneer, and the core of the wall is of concrete. They also largely used this material in constructing very extensive vaults supporting upper floors, staircases, ranges of seats, &c. Concrete also formed the basis of all the Roman roads, and in the early examples the blocks of stone laid on the concrete were much more closely jointed than was the case afterwards. There can be no doubt that the lasting nature of the Roman concrete was due, in addition to the excellence of materials, to the careful way in which it was made, and I shall have to refer again to the method of making concrete adopted by the Romans. The French have been very great users of concrete, or *béton*, as it is there called, since the year 1820, and the material has been used in enormous blocks in docks at Toulon, Marseilles, and other places, and in the construction of the mole at Algiers and the breakwater at Cherbourg. In this country concrete was employed in very early times, as for instance in the foundations of Westminster Abbey and in the older portions of the substructure of St. Paul's; but its use died out, and for a long while the only method adopted for making stable artificial foundations in bad soils was pile-driving. Although Mr. Semple, of Dublin, in 1776, suggested the use of a mixture of sand, gravel, and quick lime for structural purposes, it was not till the beginning of this century that concrete was recognised as a building material. Colonel Pasley says that the first use of concrete for foundations was by Mr. Smirke at the Millbank Penitentiary in 1817, and there is a story that the discovery, or rather re-discovery, of the fact that lime would combine with gravel and form a sort of artificial stone, was a pure accident, owing to the upsetting of a bargeload of lime during the erection of Waterloo Bridge, when it was found that the loose gravelly bed of the river had been rendered hard and compact by the action of the lime.

Now what is concrete? It may be defined as an artificial stone, composed of a mixture of hard materials, such as ballast, flints, stone chippings, broken bricks, pottery, or iron slag, called the "aggregate," and a cementitious material called the "matrix," thoroughly combined together with a sufficient quantity of water. The value of the concrete depends almost entirely upon the quality of the cementitious material, whether lime or cement, and as it is most important that you should clearly understand the difference in the properties of various kinds of lime, I must make a short digression here in order to describe them.

You are, of course, all aware that lime is produced by burning limestones, and upon the constituents of the limestone depends the quality of the lime. First there are the rich limes produced from stones which are perfectly pure carbonate of lime, such as the upper and middle chalk formations and white statuary marble. Lime made from these stones is commonly called chalk lime, and is much used for mortar and concrete in country districts where chalk is plentiful. This lime when mixed with water commences to slack as it is called, *i.e.*, it swells, hisses, gives off hot vapour, and falls into powder, and if it be then mixed with water it will always remain of the same consistency and never harden at all; and as it is soluble in fresh water, mortar made of chalk lime should never be used for external work, as the action of the weather will soon render the joints quite soft; and any one who has been present during the pulling down of buildings the mortar of which was composed of chalk lime will have noticed how easily the bricks are separated, and what a large amount of dust comes from the demolition. Then come the poor limes made from the argillaceous or clayey limestones, which contain, in addition to the carbonate of lime, various foreign substances, chiefly silica and alumina, and often a small quantity of oxide of iron. The existence of a small quantity of these foreign substances,—as in the Dorking, Halling, and Merstham limestones,—causes the lime made from them to show much less violent action when slacked, and enables it to set after slacking, but not under water. Next come the blue lias limestones, which contain a greater quantity of silica and alumina, and produce what are called hydraulic limes, which will set and continue to harden under water; and after these come the so-called natural cement stones found in the London clay formations at Harwich, Sheppey, and the Isle of Wight, or imports of Yorkshire in the clays of the oolitic series. These contain even more silica and alumina, and from them used to be manufactured the Medina and Roman cements, which had the power of hardening under water very quickly. These cements enjoyed a high reputation for many years, but they are now almost entirely superseded by the artificial cements of which Portland is the type. You may take it roughly that rich limes contain over 90 per cent. of carbonate of lime; grey-stone limes, such as Dorking, about 80 per cent.; blue lias from 66 to 70 per cent.; and cements 40 to 50 per cent.

When it was a well-ascertained fact that for building purposes lime obtained from the limestones containing a considerable proportion of argillaceous earth was the best, the idea began to gain ground that an artificial cement could be manufactured by mixing chalk with various kinds of clay, and calcining the mixture. The first patent ever granted for the manufacture of an artificial cement of this kind,—called Portland cement from its resemblance when set to Portland stone,—was taken out by a Mr. Aspden, in 1824 (who describes himself as of Leeds in the county of York, bricklayer), but the manufacture was not placed on a really scientific basis till Colonel Pasley carried out his elaborate series of experiments during the years 1826 to 1836. As so often happens with scientific discoveries, it appears to have been by pure accident that he discovered, after many failures, the superlatively good qualities of the alluvial clay or mud of the lower basins of the Thames and the Medway; this clay, which has been deposited in the tidal waters of these rivers, containing exactly the right proportions of silica and alumina for combining with the chalk. It would take too long to describe in detail the manufacture of Portland cement, but briefly it is this: the chalk and clay, in the proportion, as a rule, of about 70 per cent. of the former to 30 per cent. of the latter,—though these proportions vary with the nature of the chalk,—are ground under rollers and intimately mixed together with a great quantity of water until the mixture is of the consistency of thin paste, which is allowed to settle. The water is drawn off, and the residue is left to dry. This is then cut out in lumps and taken to the kilns, when it is burned at a high temperature, and it is very important that the whole of the mixture should be thoroughly burned. The effect of the burning is to drive off all the carbonic acid gas, and to leave the mixture in the form of clinkers. These are then carefully ground to a powder under millstones of such a degree of fineness that it will all pass through the meshes of a sieve having 625 holes to a square inch. The weight of the ground cement should be as nearly as possible 1 cwt. per striked bushel, and the specific gravity 3·00. The essential difference between lime and cement is that lime slacks with the addition of water, while cement does not. Lime powder after slacking will not set if mixed up with water, unless sand be added to it, while cement will set at once, and equally well in the water and the air. The property of setting quickly and setting under water makes Portland cement of the greatest value, and its use for concrete is extending every day.

Now with regard to the aggregate. This may consist of ballast, stone chippings, broken bricks, &c., but the latter should never form the whole substance of the aggregate, and care should be taken that the pieces are not too large. In the case of ballast, it is most important that it should be clean and free from any admixture of loam or earthy substance. And there is one other point to be remembered, which is, that the concrete will be much stronger for the admixture of a small quantity of sharp sand, which will fill up the interstices between the pebbles, &c., and will make a much more solid mass of the whole.

Having thus described the materials of which concrete is composed, I now come to the mixing process, and this is a matter which is far too often neglected. We all know the good old rule-of-thumb way in which ordinary builders' labourers mix up the concrete: a heap of ballast and broken bricks is piled up, a certain, or rather very uncertain, quantity of lime is poured out on it from a sack, the water is added according to the discretion of the mixer, and the mass is quickly turned over, and wheeled and shot into the trench, and a very superficial examination is often sufficient to show numerous nodules of unslacked lime after it has been thrown in. Now this is a most unscientific and improper way of preparing concrete: the great essential is that the lime should all be perfectly slacked during the mixing of the concrete before it is thrown into the trench, and that exact proportions should be maintained.

For ordinary foundation purposes, if what is called stone lime be used, two measures should be prepared, the cubical contents of the one being four times that of the other. The large measure should be filled with ordinary ballast, and turned out on a boarded platform; to this should be added a small measure full of sand, and then a small measure full of lime: this will give the proportion of five parts ballast and sand and one of lime, and if this be well mixed and turned over after the water is added, which should be done gradually and in small quantities, it will make a very good concrete for ordinary purposes. If the ballast and sand, before the admixture of the lime, amount to a cubic yard, it will be found that about thirty gallons of water will be required to mix it thoroughly.

* By Mr. John Slater, B.A., being the fifth of the present course of free lectures to artisans at Carpenters' Hall, delivered on Wednesday evening last.

This mixture should be then wheeled and thrown into the trenches,—not from a great height, as used to be considered essential, for, if so, the heavier particles tend to fall to the bottom first, and the mixture will not be so well amalgamated,—levelled, and rammed. The French method of making concrete, or *béton*, which is almost exactly the same as that adopted by the old Romans, is undoubtedly superior to ours. They invariably mix up the lime and sand to form good mortar *first*, and then mix in the pebbles with it. A heap of good stiff mortar is first prepared with a moderately hydraulic lime and sharp sand: a barrow full of pebbles, which have been washed, are then spread out on a platform; over it is spread a barrowful of mortar, then a second barrowful of stones, and then another of mortar, and the whole is turned over with spades and dragged backwards and forwards with rakes till the pebbles have become thoroughly enveloped in the mortar, and the whole mass is then thrown into the trenches. An extra precaution against deterioration of the concrete by contact with loamy earth is adopted in the best work by covering the bottom of the trench with another layer of sharp sand. The washing of the ballast is an excellent thing, as it tends to clear it from any earthy particles that may have become mixed with it. There can be no doubt that this is a far more scientific method of making concrete than the former; if the mortar is well made, you get the pebbles more thoroughly amalgamated, and you ensure that the lime shall be thoroughly slacked before the concrete is spread; but it is also more expensive, and I should not consider it necessary to use this method in ordinary cases. But where the soil is very wet, or in any case where the stability of the foundation is of very great importance, I should always recommend the use of cement concrete. With ordinary care in mixing this, supposing the materials are of good quality, you know you can rely upon its setting quickly and forming a perfectly solid foundation, and you need be under no apprehension of having it spoiled by the inroad of water. The cost is more than that of lime concrete, but not so much more as the difference in cost of lime and cement, because you can use less cement proportionally. Six parts of ballast, one of sand, and one of Portland cement will make a concrete good enough for almost anything in the way of foundations. Care should be taken that not too much water is used. Faraday, the eminent chemist, said that in the production of concrete the great thing was the discreet and accurate use of water: if too much be used it will wash the cement away from the particles of the mass before it has time to become thoroughly indurated. If the trench in which the concrete is to be spread is not too deep,—that is, not above 18 in.,—my own opinion is that you will get a harder and more solid mass by filling it up at once to the full thickness, and not putting the concrete on in layers; but if you have to put the concrete 5 ft. thick, it must, of course, go on in layers. In any case, it will be much improved by being well rammed after levelling. In such a material as concrete there must be a large number of minute air spaces,—you can see them with the naked eye in concrete that has set,—and the act of ramming will drive out much of the interstitial air and make the particles of the mixture more compact, and the denser such a material is the stronger it is. Numerous experiments have been made to ascertain the loss of bulk in making concrete. Professor Hayter Lewis found that 27 cubic feet of Thames ballast mixed with 4½ cubic feet of lime and 40 gallons of water, made exactly one cubic yard of concrete; and in some tests made by the Royal Engineers, it was found that 27 cubic feet of broken stones, 9 cubic feet of sand, 4½ of Portland cement, and 28 gallons of water exactly made a cubic yard. The difference between the two experiments may be accounted for entirely by the presence of the sand in the latter case, because the probability is that if a measure containing a cubic yard were filled with broken stones or ballast, it would still hold 8 or 9 cubic feet of fine sharp sand, because the pebbles will not lie close. It is sometimes stated that concrete expands after being mixed; if it does, it is because it has been improperly mixed, and any expansion that takes place after mixing can only cause some disintegration to take place.

Hitherto I have spoken of concrete as used for foundations only, but there are many other purposes for which this material can be employed. I suppose it is not much more than twenty years ago that building materials and labour, being at a very high price and by no means of very high quality, the idea began to gain ground that concrete might be used for the walls of buildings. I have already alluded to the fact that the Romans used it for these purposes, and that, too, although they only had lime, whereas we have Portland cement. But the mixing of the pozzolana, which I have previously mentioned, with the lime gave it many of the characteristics of a cement.

The Italian architect Palladio, writing 300 years ago, gives a very good account of the Roman method of wall construction. He says "The Ancients used to make walls called *reimpiuta, i.e.*, filled up with rugged stones, which is also called coffer-work, taking planks and planting them edgewise in two rows, distant from one another the thickness of the walls and filling the space between them with cement, stones of all sorts, earth and mortar mingled together, and so on from course to course." This method of using concrete for walls is called monolithic, the concrete being simply poured, in a semi-fluid state, into the position required, to which it is confined by boards, and it sets in that position, so that the whole of the wall is one compact homogeneous mass. Another method is to form slabs of concrete by casting it in moulds and allowing it to set there, and the slabs are then taken out of the moulds and carried to the place required and used in the ordinary way, just like bricks or stone. The former system, if only ordinary care be taken, makes undoubtedly the strongest work, as there are no joints, either vertical or horizontal, and, moreover, no skilled labour is required in this construction, ordinary labourers being able to mix the ingredients and fill in as required. Several systems of apparatus have been invented for confining the concrete to the requisite thickness of wall, and for shifting the moulding boards from one stage to another, and many of these are of somewhat complicated a character, but it is very doubtful if any material advantage is gained over the simple plan of nailing the boards to the upright posts and filling in between. Walls thus constructed are really stronger than brickwork, drier, and more cheaply built, but great care must be taken in the preparation of the concrete: the cement must be of the best, the aggregate must be broken to the proper size, and the whole thoroughly well mixed. If these precautions are taken, the thickness of the walls may be about 20 per cent. less than with brick.*

* To be continued.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

SOME AMERICAN METHODS OF CONSTRUCTION.

THE seventh ordinary meeting of the present session was held on Monday last, Mr. Ewan Christian (President) in the chair.

Mr. J. Macvicar Anderson (Hon. Secretary) intimated that the Council proposed to close the library during Tuesday, Wednesday, Thursday, and Friday next week up to six p.m., but it would be open in the evening as usual. This was necessary on account of the number of applicants (thirty-three) desirous of submitting themselves to the obligatory Examination, and as the Council did not know how to accommodate them otherwise than by giving up the library for that purpose. As the Council believed a good many other applicants would present themselves in the course of the present year, it was proposed to hold another examination, possibly in November next. At the examination held towards the end of last month in Leeds, eight professional architects had been examined, but the result had not yet been made public.

A letter was also read from Gen. Ponsonby, stating that her Majesty had given her sanction to the selection of M. Charles Garnier as Royal Gold Medallist for the year.

Mr. R. Phené Spiers asked whether there was a possibility of the Council acquiring the use of the downstairs galleries at any future time. There had been considerable difficulty from time to time in finding space for the hanging of the drawings submitted for the various prizes, and he believed these difficulties were likely to increase in the future. It had been intimated that in consequence of the large number of candidates for examination, the library would have to be given up on certain days, while the two magnificent galleries downstairs were, so to speak, in the hands of outsiders.

The President.—If the numbers increase as we have heard this evening, we may hope that we shall be able to take the additional galleries; but at present it is a question of finance, and we cannot venture to do it until we are in better circumstances. The next thing I have to announce is that a special general meeting, to consider the Charter, will be held on Monday, April 5th, at seven p.m.; and that, in case of any adjournment, it will be continued on the next day at eleven a.m., and so on until terminated. We hope, if possible, to bring this question of the Charter to an end, and to get the opinions of the members of the Institute upon it. We do not want to have any delay.

Mr. John B. Gass (Bolton), Graduate and Associate, and Holder of the Godwin Bursary and Medal for 1885, then read a paper on "Some American Methods," of which the following is an abstract:—

As holder of the Godwin Bursary, 1885, Mr. Gass visited many important cities in the United States and Canada, his tour extending over a period of three months. He found great practical benefit therefrom, and expressed his deep sense of obligation to Mr. Godwin, F.R.S., for his institution of the bursary, and to the many American architects and others for their courteous reception and willing assistance. The subjects treated on very fully in his paper, formed only a portion of his report. The most approved method of incombustible or fire-proof construction is a system of iron construction with hollow tile arches, the voussoirs having sides about ¼ in. thick, and all the ironwork encased in ordinary or porous terra-cotta, specially made to suit positions, and plastered on top. Partitions or internal walls are made of hollow tiles which have good bearing power; a 5-inch hollow tile wall resists heat better than a 12-inch brick wall. Roofs are constructed of hollow tiles or porous terra-cotta slabs, supported by wrought-iron joists, and covered with various kinds of roofing. Underside of wooden joists and inside wooden frame houses are made fire-resisting by terra-cotta slabs plastered on face. This is being extensively used, and has stood severe tests. Ordinary brick arching in 4-ft. spans resting on cross wrought-iron girders is still used, notwithstanding many disastrous failures. Concrete floors are occasionally used, in some cases as arching with corrugated iron soffit, in others with wrought-iron joists and flat soffit. Slow-burning or mill construction is in general use for all sorts of mercantile buildings, and affords excellent protection against fire spreading. Walls of brick, square columns of wood, not tapered, with cast-iron pintle between; wooden beams, plank floor 3 in. to 4 in. thick, with hardwood laths in joints, flooring of 1¼ in. hardwood boards with laths, laid over two thicknesses of rosin-sized sheathing-paper or ¾ in. mortar. No painting, varnishing, or filling on woodwork for at least three years after the building is finished. Where special danger of fire exists, woodwork is encased with bright tin. Roofs with similar construction to floor, with outer covering of tin, asphalte, tar and gravel, cotton duck, &c. Double doors, with air space between, to prevent fire spreading; one door for closing in ordinary use, the other kept open by automatic fastening, which closes in case of fire. These doors made of two thicknesses, tongued and grooved boards, covered with bright tin, or made of strong iron. Wire cloth lathing kept ¾ in. from the woodwork and ironwork, and plastered on top, is used for fire protection, as also are "Merritt" plaster, the basis of which is asbestine, and magnesio-calcite, a saturated paper pulp. Brick walls to houses being generally furred with wood inside before plastering, "fire stops" of incombustible material are used at top and bottom on each floor to prevent fire spreading. In New York and other cities, outside fire-escapes are required on all tenement, flat, and apartment houses, office buildings, lodging-houses, and factories; stand-pipes, with nozzle to each floor, run up alongside the fire-escape. In the great fires at Chicago and Boston, brick stood the best for walls, stone calcined, limestone fronts in many cases burned off, leaving the brick backing standing one or two stories in height. Sandstones stood better than limestones,

but granite disintegrated very rapidly; artificial stones suffered less damage than natural stones, and mortar stood better than bricks. Cast-iron columns failed very badly, bringing down whole buildings, and the failure of floors was generally from the exposed ironwork. Telegraph-poles got charred, but stood where buildings around were completely destroyed. In conversations with several chiefs of important fire-brigades, it was noted that the terra-cotta block system, with all iron encased, was thought by them to be the nearest approach to a perfectly fireproof building; brick arching for floors and ironwork exposed universally condemned; slow-burning construction, with floors made watertight, advocated for mercantile buildings; some place in the roof that could be made to serve as smoke-outlet should be provided in buildings of large size; one wood door, covered with tin, better as fire protection than one iron door; but two iron doors, with air-space between, better than two wood doors. The "fire-protection" apparatus for mill buildings is very complete, well arranged, and regularly inspected by the officials of the Mutual Fire Insurance Companies. In addition to other apparatus, sprinkler systems are in general use. These are formed by parallel lines of pipes, extending across the rooms, near the ceiling, and connected with a good water-supply. In valve-sprinklers, rows of perforated pipes are fixed in sections, in which the water can be turned by valves in case of fire. Automatic sprinklers are various forms of apparatus set in motion by the fire itself, at first breaking out, and are brought to bear directly on the place where the fire exists, and so arranged that when any one is in action, the flow of the water sets an alarm-bell in motion. They are attached to the water-pipes at frequent intervals, and depend for their action on a solder fusible at a low temperature, ordinarily at from 150° to 170° Fahrenheit. The Grinnell sprinkler is the most largely adopted, and others in use are the Parmelee, Walworth, Victor, &c. From Mutual Insurance Company's returns, 1877 to 1885, in buildings protected by automatic sprinklers, there were 195 fires reported, with an average loss of 327 dollars per fire; in buildings not so protected, 553 fires, with an average loss of 7,794 dollars per fire. Ventilation and heating receive great attention in many parts of America; owing to the dryness of the atmosphere in the winter, and the greater evaporation from the body, it is necessary to keep a higher temperature in the rooms than is the case in England. At the Massachussetts Institute of Technology, Boston, there is a plenum 3 ft. high, under the whole of the basement of building, into which fresh air, warmed or not as required, is put under pressure of ⅛ in. water column. Air distributed from this to rooms through flues, 36 in. by 12 in., with steam coil-box at the bottom of each, the temperature and volume being regulated by the engineer from the basement. Inlets into rooms 8 ft. above the floor, and larger than the area of the flue, so as to ensure slow movement. Outlet flues have two apertures in the room, one a few inches from the floor, and the other close to the ceiling,—the former wholly used during school session,—outlets discharge above the roof. The outlets are smaller than the inlets, so as to give pressure against the outside and prevent draughts. The whole system is under the control of the engineer, who maintains a temperature of about 65° in the rooms; he is furnished at evening with the weather prediction for the next twelve hours, and is responsible for the thermal condition of the building at the hour of opening, being under explicit orders as to steam and air supply for various conditions of weather. This system is successful and economical in working. At the Pittsburgh County Building and other places fresh air is taken from the top of the tower, passes over steam coils and through water washer, put under pressure by fans in large ducts, and conveyed through flues to rooms, exhausted into chimney with smoke flue from boiler in centre. The systems adopted at the American Bank Note Building, State Hospital for Insane, Norristown, Pennsylvania; Roman Catholic Church, New York; and the Canadian Parliament Houses, Ottawa, were also described. The Baptist Church, Toronto, is amphitheatrical in plan, and has floor saucer shaped. In the winter fresh warmed air is admitted to the church at the highest point in the floor; the foul air is extracted from the floor level through trefoil openings in each bench-end, and connected by small flues into the main trunk in the basement, which is exhausted into large vent-flue, having the smoke-flue from hot-air stove in centre. There is roof ventilation for summer use. At McVicker's Theatre, Chicago, fresh air is taken from 60 ft. above ground, filtered, passes over steam coils in winter and ice-chamber in summer, forced into auditorium by fan through openings in ceiling. Extracted through openings in risers of floor and exhausted by means of fans. Air changed in auditorium every fifteen minutes. The system of down-current ventilation used with success, but not available where gas is burned. The extracts at floor level are ordinarily used in cold weather, however the warm air is admitted into rooms. Heating by indirect radiation often adopted for houses. The difficulties with, and objections to, steam heating are partially removed by the use of fractional valve. In the Canadian cities particularly, many steam-heating apparatus have been taken out and hot-water systems put in. In houses heated by hot-air, steel-plate furnaces are found the most satisfactory. There are open fireplaces in the best houses. The Morse sun-rays' heater and ventilator is fixed outside the building, and acts when the sun is shining on the black and roughened outer covering. The progress of American architecture has been remarkable within the last few years, and though there is much that is bad, vulgar, and pretentious, it has begun to exhibit artistic and peculiar qualities of a very high order. The best specimens are scholarly and refined in detail, but adhere less slavishly to precedent than European work. New combinations are introduced, dictated by and growing out of the necessities of the building, without violating the character of the style. The best work is accordingly living and interesting, less the production of a dry-as-dust archæology, and more in accordance with the true principles of all great architecture.

Mr. A. J. Gale (the first Godwin Bursar) proposed a vote of thanks to Mr. Gass. It was not at all an easy matter to go to America for the purpose of investigating its architecture, because there was so much to see, and a great deal of time was spent before the best examples were found. Mr. Gass was right in speaking of the help which American architects afforded to their English brethren who visited that continent, as they were gratified at their works being thus studied by Englishmen. He hoped this might not be the last occasion on which a Godwin Bursar went to America. The benefits arising from the reading of the paper and an inspection of the drawings on the walls could, however, be little, compared with the benefit which such a Bursary conferred on its holder. He (the speaker) had not visited Canada, but he believed that the Canadian was not equal to the best American work. It was invidious to draw distinctions, but Mr. Richardson's work was universally good, and one of the most valuable things he was doing for the future of American architecture was his exertions in training men for the profession who would worthily succeed him.

Mr. John Slater, B.A., in seconding the vote of thanks, remarked that the members must have inspected the drawings and photographs on the walls with admiration, perhaps, in some few cases, not unmingled with a little awe. There was no doubt as to the value of the Bursary established by Mr. Godwin, who had foreseen the good architects would derive from finding out a little of the methods of American and Continental construction, and from learning that we in this country had no monopoly of excellence. The constructional methods of America seemed to show a boldness and breadth of aim, and a lack of conventionalism, which were really refreshing. Whether the lack of conventionalism in some of the artistic work was a subject for commendation must be a matter of opinion; but structurally, he believed, there could be no doubt about it. As to the fireproof system, the Americans were far ahead in that respect, and he could not help thinking that we might make our buildings far more fireproof than they were at no very great expense. The Americans also proceeded in a scientific manner with the question of the foundations, and in many cases they had to face greater difficulties than were met with in this country. In this connexion he should like to call attention to the excellent fireproof system which had been introduced by Mr. Lindsay, of the Paddington Ironworks, called "steel decking," which was being used by Mr. Waterhouse at the National Liberal Club. It was impossible to read the professional journals of America, or the programmes of the various industrial universities and institutes of technology, without seeing what immense strides had been made in the matter of architectural education. Though a young nation, they had yet done infinitely more than our own in this respect. No doubt we had done a good deal, and the obligatory Examination was an instance of this, but we had not gone far enough, and this question of the education of students of architecture would have to be faced and fought out by the Institute in combination with other bodies. Mr. Slater then quoted the *curriculum* for an architectural student at the Massachusetts Institute of Technology, which was of a very comprehensive character, and contended that it was a disgrace that in England generally the architectural student had no such means of studying his profession as were available on the other side of the Atlantic. No greater benefit could accrue to the members of the Institute than to learn something of the methods of other countries, and to occasionally take stock, as it were, of their own deficiencies. With this object in view, he would venture to suggest that, as a number of honorary and corresponding members were on the roll of the Institute, some means should be adopted to make these gentlemen a little less honorary, and a little more corresponding. Great good would be done by getting them to give an occasional communication on the sort of work going on in their city, country, or district.

Mr. Alexander Payne asked if the drawings and photographs displayed on the screens could be kept up for some time?

The Secretary replied that the drawings would be on view all the week.

Mr. Rickman thought Mr. Gass had been wise in confining himself to a few results of his labours. In visiting Canada and the States one saw a very marked change from the architecture of this country. In the United States a class of buildings of our own date were to be seen, in connexion with which the architects had thrown aside survivalism, and had worked according to their own ideas. In spite of this, he found, when there, that he was not so shocked with the *bizarreries* of their appearance as he had anticipated.

Mr. Phené Spiers remarked that it might be interesting to say a few words as to the origin of much of the past architecture on the other side of the Atlantic. The American students had studied chiefly in France. Mr. Hunt, one of the oldest Corresponding Members of the Institute, was a student of the École des Beaux Arts, where Mr. Richardson had also studied at the time when he (Mr. Spiers) was there. In 1867 or 1868 Professor Ware visited this country to study English art, and subsequently went to Paris to lay down a scheme of architectural education for an Institute at Boston. This system had been introduced into the Institute of Technology at Massachussetts, and was also being introduced into another Institute at New York. From time to time during the last twenty years he (Mr. Spiers) had received the visits of many of Professor Ware's most promising pupils. Feeling that the education he was able to give them was not sufficient, the Professor advised them to spend a few years in Paris, and on their way they had invariably called upon him for advice as to the course they should pursue when in the French capital. The style, therefore, which those who founded that school had taken as their starting-point, had been modelled on French ideas, such as would be found in the Library of St. Geneviève, in the building of the École des Beaux Arts, in the Imperial Library, in the Stamp Office, and in various other buildings. If they bore this in mind, and looked at Mr. Richardson's drawings and photographs, they would see from whence he drew his inspiration. At the same time they would observe how the practical American had caused the Byzantine or Néo-Grec style to be so materially altered, that it became to a great extent an original series of conceptions. The Harvard Law School showed a great amount of originality and peculiar refinement, mixed with extreme breadth and boldness. It would have been impossible, he believed, for an English architect to have gone to the extent Mr. Richardson had gone, as he would have had numberless critics pointing out how he had sinned against the laws of ancient art.

Mr. Spiers concluded by saying that he looked forward with much interest to the future of American architecture.

Mr. Hugh McLachlan (second Godwin Bursar) said that both in America and in Germany the questions of heating and ventilation were more thoroughly considered than they were in England.

Mr. Dawson having made a few observations,

Professor Kerr remarked that he had visited America forty years ago, and he had always taken great interest in everything connected with that country. In the matter of architecture, there were two roads in which America might be expected to make very considerable progress; one was in respect to ingenious construction, and the other in what might be called originality of design. The whole population of America seemed to grasp the necessity for new inventions, and when an invention was brought to bear fully upon any requirement, it appeared to be done, not in the rough-and-ready way to which we were accustomed, but in a precise and practical manner, which showed the Anglo-Saxon intellect at its best, in that particular sphere. In this country we seemed to be too greatly trammelled with old traditions, and did not appear to get beyond the instruction received at school; but the Americans threw all that to the winds, and struck out for themselves, whenever occasion required, some new contrivance. Mr. Spiers had referred to the influence of France, but the Americans occupied a peculiar position in regard to architectural design. They were the English of the future. Design was a much more difficult thing to deal with than mechanical contrivance, because it seemed to march with the ages in an independent career of its own. When he was there forty years ago Trinity Church, New York, was just finished, and was considered a very fine building, and Grace Church, at the other end of Broadway, had been finished with a crocketed spire in cast-iron, painted to imitate granite. The then Editor of the *New York Herald* characterised this spire as being like a crocodile standing on its head, and this was the style of criticism which prevailed in England at the present day. Since then the Americans had made amazing progress, which, as Mr. Spiers had said, was largely due to French influence. The students came to London, got advice from Mr. Spiers, and saw what we were doing. Thus a sort of cosmopolitan style of architecture would gradually be evolved in America, where wealth was progressing more rapidly than in this country. The tendencies towards all the manifestations due to the profession of almost excessive capital were more fully exhibited there than here, and he believed their successors would find Transatlantic architects not dealing in sham Gothic or Néo-Grec, but in a modern American style of their own.

The President, in closing the discussion, said it was a great satisfaction to him to hear such a paper as this. It showed how far-reaching and useful was Mr. George Godwin's idea in founding the Bursary. When he was in America he saw a very great deal of work which disgusted him, but the impression he derived was that a great revolution was going on in matters of art, and that a period of good work was coming on.

The vote of thanks was then put, and cordially received; and Mr. Gass having suitably replied,

The President adjourned the meeting to the 29th inst., when a business meeting will be held to receive a communication from the Council in respect to the report of the Departmental Action Committee, recently printed in the Journal of Proceedings.

Leeds.—Plans for the proposed completion of Emanuel Church, Leeds, at a cost of 1,200*l.*, have just been unanimously adopted by the parishioners. One most important feature of the contemplated improvement, viz., the filling of the east window with Munich stained glass, has already been completed. The window consists of five lights, with a large rose above. The centre compartment represents the Good Shepherd; the other four compartments containing figures of the Evangelists,—their emblems being introduced in the lower panels and the pelican under the principal figure. The window has been presented by Miss Pegler in memory of her mother, the late Mrs. Charles Pegler, of Leeds; and has been designed and executed by Messrs. Mayer & Co.

ARCHITECTURAL PHOTOGRAPHS BY AMATEURS.*

IF an architect thinks seriously of starting a camera, what sort of camera should he get? What process should he use? What outlay on apparatus? Cost in time of a negative, and a print, and outlay for materials? Additional weight of baggage in travelling? What are the average results obtained by people who cannot wait for the very favourable moments, and can only practise the art at intervals? Kind friends, by supplying a large show of suitable photographs and of transparencies for the lantern, and by stating facts, have enabled me to answer such questions.

Mr. J. L. Robinson, of Dublin, the hon. amateur photographer to the Architectural Association Excursion, has contributed over 800 illustrations of English architecture taken during the excursions to the A. A. Library; and, bound in volumes, they are in much request. The example is worthy of imitation. Mr. J. C. Stenning, Mr. J. Clerk, Q.C., Admiral Maitland, Mr. Gifford, Mr. Seymour Conway, Lieut. W. R. Little, Mr. J. Gale, Mr. R. L. Cox, Rev. F. C. Lambert, and others have also enabled me to exhibit specimens of the work of able amateurs.

For our present purpose we may regard photographs as shaded diagrams showing the existing condition of old buildings,—grand, picturesque, well preserved, in decay, or in ruins,—to be used as aids to the study of architecture, archæology, and topography; or as giving the expression, surroundings, and details of modern buildings; records of works in progress, records of constructive appliances, of the curiosities of other days and of the novelties of our own; and we will not indulge in needless regret over the limitations, or in aspirations after the possibilities, of the art. In order to justify to some extent a fairly complete and proportionate sketch it will be well to assume unimaginable ignorance,—of a density which not one of us would perhaps be vain enough to own to. By this device the answers to the special questions, put on behalf of an architectural amateur trembling on the brink, may be given in an orderly way.

Processes.—At the present time the gelatino-bromide process has the greatest number of admirers. The wet collodion process, which up to 1879 was that universally in use, has been laid by. The glass was, for that process, coated with collodion (gun-cotton dissolved in ether), containing a small amount of bromide of ammonium, and was then immersed in a solution of nitrate of silver, and the bromide converted into bromide of silver. The invisible lines adjoining the blue portion of the spectrum have the power of producing chemical change, and darkening the bromide of silver. Only these portions of any light, distinguished as actinic rays (ἀκτίς, ἀκτῖνος might be any ray, but some nomenclature is a necessity), produce permanent effect on the chemical condition of a negative. The highly-lighted portions of a scene reflect strong light and turn the corresponding portions of the negative black (sky and high lights), deep shadows remaining almost untoned. The operator usually prepared his plate just before using it, and fixed it at once. His fingers, of course, touched the nitrate of silver (lunar caustic), and when the light came upon them the coating turned black. Cyanide of potash was required to make the fingers fit to be seen. The photographer, who uses ready-prepared dry plates, congratulates himself on not requiring the services of that deadly drug. In using the wet collodion process for out-door work, it was necessary to carry about a portable dark room, or dark tent, and the chemicals required for rendering the plates sensitive, and those for developing them. This cumbrous addition to the baggage led to the use of collodion dry plates. The early ones were those in which glutinous matter, such as beer, treacle, glycerine, coffee, tea, or tannin, was used to act on the silver. Later on, nitrate of silver was dissolved in bromised collodion; being allowed to set, it was then well washed to remove the free salts of silver, and dissolved in ether. The plates were coated with this preparation, dried, and used as the gelatine plates are now; but the sensitiveness being less, the exposure varied from one to ten minutes. These collodio-bromide plates were brought to great perfection by Colonel Stuart Wortley, and much used until gelatine plates were prepared.

The earlier attempts to use gelatine, by sensitising glass plates and paper coated with gelatine in the silver bath, were not satisfactory. The first attempt at the modern method was described by Dr. Maddox in 1871, and the process came into general use in 1879. Improvements have been steadily introduced during the six years last past; the art is a living art, and living at a great pace too. Gelatino-bromide dry plates are now manufactured in large numbers, and supplied ready for use; millions of "commercial dry plates," as they are called, are produced every year for home use and export; they are sent away by the ton. The glass is coated with a viscid solution of gelatine, in which bromide of silver is held in a state of suspension; the sensitiveness of the plates,—as in the case of wet plates,—is in the bromide. Probably the majority of amateurs avoid the tedious labour of preparing their own plates. As, however, about two-thirds of the outlay for producing a finished photograph goes to providing the dry plate for the negative, enthusiasts do the work for themselves. They say, besides, that there are advantages beyond the money saving, in being taken behind the scenes, and getting knowledge of the nature of the plates which could not be obtained without this experience.

The glass commonly used is carefully selected crown glass, weighing about 15 oz. to the foot. The preparation of the solutions, which are to form the emulsion for a batch of plates, will take about three hours; the emulsion may then be left to set. On another day the soluble nitrates and bromide will be washed out by water, leaving only the insoluble bromide and iodide of silver in the emulsion. The emulsion being melted, filtered, boiled, and stirred, three to five hours may be agreeably spent, finishing up with the cookery. The boiling process may, however, be modified by using Professor Ecler's method, in which the emulsion is not heated beyond 150°. This method is now almost universally applied, and shortens the time a good deal. The coating of the plates with the liquid is done with great rapidity; the emulsion stiffens upon the glass, and does not run off or move. After the plates have been put into a drying-box, arranged so as to allow plenty of dry fresh air to pass over them, they will be ready for use in from half a day to a couple of days. They will improve in many ways after being kept some time,—notably they will have no tendency to frilling which frequently happens with very new plates. The idea of any actinic light reaching the sensitive films is full of terrors. A second's exposure to a naked gaslight, even at the distance of several feet, produces a strong impression, which appears as fog in a negative. Ruby glass of the deepest shade is used in the dark room. Camera and lens tubes are lined with black velveteen, and black cloth is put over the camera during exposure. Kept carefully in the dark and the dry, the plates will last for a long time,—perhaps, under favourable conditions, for ever,—but it is unnecessary to try the experiment.

The sensitiveness of the plates varying considerably, they are classed as ordinary, rapid, and instantaneous. It is supposed that the reason why gelatine plates are so much more sensitive than collodion is that the sensitive salts are in a finer state of division. The sensitiveness is at any rate increased as the division is carried still further by additional cooking of the emulsion. It is usual to indicate the sensitiveness of dry plates by a comparison with wet collodion plates. It is supposed that everybody has used wet collodion, though it has been less and less used for six years, which experts seem to look upon as several lifetimes,—an interesting example of a survival. Ordinary plates have from twice to thirty times the sensitiveness of wet collodion plates; about ten or twelve times is recommended for ordinary work. Instantaneous will reach sixty times; these are charged for at the rate of about one-fifth more than ordinary plates. For sea-pieces, crowds of people, races, and such scenes,—not found in the direct path of an architectural amateur,—an exposure of 1-200th part of a second is sufficient. The Oxford and Cambridge boat-race, with all the crowds on the bank and river, needs a very sensitive plate and short exposure. For trotting horses in various positions the exposure is put at 1-2000th part of a second. Such short

* A paper by Mr. S. Flint Clarkson, F.R.I.B.A., read before the members of the Architectural Association on the 12th inst.

exposures require special lenses which admit more light than those used for ordinary work. The time of exposure of a succession of plates, all prepared with the same emulsion, will be varied to suit the hour, and the brightness, or the reverse, of the day. Experienced people know, without the labour of thinking, whether 1-50th part of a second or three seconds will be required for a special subject on a bright day; or whether it should be three or five seconds on a grey day; five or ten seconds on a dull one; ten minutes or half an hour in the inside of a building. The camera may be left to itself, by an eager well-occupied student, if the light is deficient, and the image is consequently coming on at an easy rate. It is satisfactory to know that, in such circumstances, two, three, or five minutes more or less exposure make practically no difference, as the plate may be developed so as to make the best of what proves to be an under or an over exposure.

The cost of the 150 plates, from which successful prints were obtained illustrating the buildings visited in the Banbury excursion, allowing 10 per cent. in addition for damages, would be 3*l*. 5s. Prepared cleverly, instead of being bought, they would come to about one-third of this amount, but the large expenditure of time has been hinted at above.

Prophetic persons state that the paper processes will in time supersede all others,—at any rate, for amateur work in the open,—on account of ease in carrying and in manipulation, no risk of breakage, rapidity of printing, and reduction of first cost. I have felt that to deal with the gelatine process, and to leave remarks in the paper processes to others, would be my safest course. Notwithstanding all the advantages claimed for paper, dry plates are more largely used every year. It is said that the army of amateurs using dry plates has become, within a few years, as large as it was twenty years ago, when the collodion process first became popular. No film-carriers or roll-holders have as yet inspired such general confidence as the gelatine plates, and there is, apparently, a suspicion that uncertainties in the manufacture of papers occur rather frequently.

Cost.—A camera, 7½ in. by 4½ in., a Ross's symmetrical view lens with diaphragms on the system recommended by the Photographic Society, and three double backs or dark slides,—to take in all six sensitive plates,—should be acquired by an amateur when he is about to begin actual work in earnest. For these, with tripod, level, and other necessaries, about 11*l*. will be required: on the chemicals and other apparatus for dealing with negatives and for printing at least 3*l*. must be expended in addition. "Quarter-plate," 4¼ in. by 3¼ in., is sometimes recommended for the first start, just in order to get the hand in; but 5 in. by 4 in. is better. The first cost of this should be about 9*l*. This meagre outfit is a minimum; but spoken for in order that the first trials may be made with freedom; without any idea, at least, that possessions have made it difficult to go back. More lenses will be wanted for careful work afterwards. Instructions to beginners are given by arrangement with makers of apparatus, and there is a class at the Polytechnic. When the amateur starts on his first expedition,—hoping, perhaps, rather than believing, that his slender store of knowledge will prove sufficient for the occasion,—his expenditure, if he has taken to a 7½ in. by 4½ in. camera and has been careful, will have amounted to about 17*l*.

Leaving on one side first cost of apparatus and all costs incurred in travelling, &c.,—counting only the costs out of pocket for plates and chemicals,—a 5 in. by 4 in. negative will cost about 3d. by the time it is varnished and can be shown in the light of day. The first print will cost about 1½d. For 10 in. by 8 in. the completed negative may be put at 1s., and the first print at 3d. [The six small photographs reproduced in the *Builder* this week are from 5 in. by 4 in. prints, and the larger one from 10 in. by 8 in.]

It is not unusual, for people with many irons in the fire, to finish off the negative, take a trial print, and then entrust further reproductions to others. For six years the members of the Architectural Association have been supplied with admirable prints at a charge of 6d. for 10 in. by 8 in., and 3d. for 5 in. by 4 in.,—evidently a very low price as such things go. The assistant's time and a working profit are, of course, included in these prices; and a hard-working amateur, who is liberal in gifts to his friends, may be satisfied to take over these with his other rewards.

Notes as to Baggage.—For the Banbury excursion this session, four dozen 10 in. by 8 in. plates and ten dozen 5 in. by 4 in. plates were required. Two dry-plate cameras, dark slides and changing boxes, tripod, level, lantern, and the fourteen dozen of plates increased the ordinary traveller's baggage by about 65 lb. The risk of breakage of the plates,—if there is a steady hand, and if proper boxes, cases, &c., are used, may be very small,—during six annual excursions no important negative has been injured before the arrival at home. Still, glass is fragile,—and losses have happened in afterwork done in quasi-comfort in the dark room at home, and thereafter in rooms not dark. The 10 in. by 8 in. camera weighs 12 lb. with changing-box, tripod, and six plates,—twelve plates for it weigh about 7 lb. The 5 in. by 4 in. camera with six plates weighs only 7 lb.; it is not unfrequently looked upon as a suitable companion for a day's walk among the mountains. A dozen 5 in. by 4 in. plates weigh about 2 lb. If the resolve has been made that six 10 in. by 8 in. and eighteen 5 in. by 4 in. negatives shall be obtained within the day, it is necessary to start with 20 lb. of baggage; that is, two leather cases containing the cameras and changing-boxes,—the tripod, contrived to fold into a length of about 2 ft., may serve as a handy bâton.

Completing Negatives.—The ingenious automatic changing-box is a little luxury which, when holding a dozen plates, costs about 4*l*. 10s. A plate may be transferred from the box to the camera and back again, without the possibility of light affecting it or any plate in the box. From the dark slides of the changing-boxes the plates are transferred at the dead of night into packages by the light of a ruby lamp, and fresh films are put in ready for the toils of the morrow. Guiding minds do not recommend developing plates on a journey. They will be just the same at the end of the journey if kept safe from damp and light.

When home and leisure are reached, and the eager desire felt to behold and permit others to behold the fruit of the labours, the negatives must be developed, perhaps intensified or reduced, fixed, washed, and dried,—before a trial print can be taken. Varnishing is not absolutely necessary, but there is greater risk of injury without it. After a good print has been obtained the negative is warmed, coated with varnish, warmed once more, and when cool again it is ready for the printing. Not reckoning time spent in doctoring, adding to or diminishing density, and supposing that a batch of negatives are treated at the same time, it is considered that each negative requires from ten to fifteen minutes of special attention, between the time of taking it out of the dark slide and putting the sensitised paper upon the varnished negative.

The negative, when the descent of the shutter left it in darkness, had received all the details in light and dark, but too faint to be visible,—the developing solution brings the latent image into sight, and in doing so changes the condition of the silver which has been acted upon by the light, making it insoluble in solvents which dissolve bromide of silver. If, for instance, a gelatine plate is exposed and not developed, but treated with hyposulphate of soda, all the silver salt will be dissolved, and a film of colourless gelatine will be left on the glass. The solution being poured upon the plate, and made to cover the whole of it, the first faint darkening will commence in about a quarter of a minute,—in about two minutes the whole plate (in a good negative) will be darkened, except those parts which represent blackness in the scene. It must remain till it appears denser than it is eventually to be, and practised skill can alone determine how long that must be. Of the two developing processes which are used for gelatine plates, the ferrous oxalate is considered the best for beginners, on account of its extreme simplicity and good results. More may be made of an inferior plate by the other process,—the time consumed will be about the same for each.

Development brings out the qualities of a plate which are required for printing; and fixing keeps it in the state to which it has been brought. After rinsing so as to get rid of the developer and stop that process from continuing, five minutes or so must be spent in an alum bath so as to harden the gelatine. Rinsing clears away alum from the surface, and the fixing solution is then used to take away such portions of the sensitive salt of silver as were not acted upon by the light, and by the developing solution. After their removal the plate can be brought into the light of common day without injury or risk of change. Washing for at least half an hour in running water, or frequent changes of water, will be necessary in order to get rid of the hyposulphate of soda, used to get rid of the superfluous silver.

Printing.—A sensitive film is put upon paper; this paper is laid upon the negative; and the light strikes through the negative, and acts upon the film on the paper, in the same way as the light acted upon the film on the glass. The dark portions of the negative transmit little of the light, and thus there are light parts in the print; and *vice versâ*. The preparation of the ready sensitised paper, which is so largely used, is at present a trade secret. In view of its cheapness, few amateurs now go to the trouble of preparing their own paper. It is sold ready for use at 13s. 6d. per quire; the cost of the paper for a 10 in. by 8 in. print is thus 2½d.; for 5 in. by 4 in., ½d. The paper will keep good for a considerable length of time, either before printing or between printing and toning. Superior results are gained by very experienced photographers who sensitise their own paper; but they are obliged to print and fix on the same day on which they prepare the paper, as it turns brown in twenty-four hours.

In printing, the negative is placed in a pressure frame over a piece of the sensitised paper; the frame is so made that half the print can be examined, and the other half remain in contact with the negative, so that no change in the relative positions can take place. When the light has passed through and left a perfect impression on the paper, the negative is removed. The print is then washed in water, changed twice or three times. In order to give a more agreeable tone than the red of the print at this stage, an exceedingly thin film of gold,—as thin as a soap-bubble,—is deposited upon it, from the "toning-bath," composed of chloride of gold and acetate of soda. The tint depends in the length of time passed in the bath: a print passes from red to brown, then to purple, blue, and ends in a dull, flat, slate colour. It is usually advisable to remove the prints from the bath while the shadows are still a very warm brown, the half-tones just becoming purple or violet. After the toning, washing in water gets rid of the toning solution in the paper; if this is not done the toning goes on. A solution of hyposulphate of soda does for the print what a similar solution does for the negative,—that is, removes the silver which has not been acted upon by light, and thus fixes the print. After complete washing the hyposulphate is got rid of. It is the criminal responsible for the decay of so many admirable prints. Many ghostly shapes, becoming dimmer every year, had their time of pleasant force; for years the fixing solution has been, as a work of pure supererogation, destroying the silver.

Some architects have skill in attending to their ordinary work, and to the printing of photographs at the same time. A space on a wide desk, between a large window and a drawing-board, may be covered with pressure-frames by a Cæsar-like person; and no time will be lost, nor any interest suffer. Each print will require about five minutes of special attention, from putting it on the negative to clipping it round,—sometimes more, for, with a dense negative and dull weather, it may take even two days before a good print is obtained.

Silver printing has been, and is, more largely used than any other process,—though there are others which have stanch advocates. Platinotype is said to be gaining ground. The results are permanent, the effect that of a good pencil drawing,—the surface of the paper dull, not glazed, and it is more easy to carry out than silver printing. On the other hand, it is more expensive, and an inferior negative will not yield a passable print.

Beginners are not likely to try the rapid printing papers, as they call for so much special knowledge in timing the exposures.

Fixé Prints.—A frame of these prints has been presented to the Association. A print on paper is floated in a warm solution of gelatine, then placed face downwards on clean glass, and pressed into contact in all parts with a squeegee or the hand. The surface becomes very fine: when dry they are trimmed, sized, and painted over on the back with oil colour or coated with black varnish. Treating a 10 in. by 8 in. print in this way will cost 6d. to 1s.

Transparencies are printed from negatives on ordinary dry plates. An exposure of from five seconds to a minute, according to the density of the negative, is given at a distance of 3 ft. from a gasburner,—all other light being excluded. They must be slowly developed, and fixed with fresh solution. An ordinary transparency for 3¼ in. by 3¼ in., printed from a negative, requires an outlay of about 3d. The wet collodion process is also largely used for transparencies, as gelatine is apt, unless very skilfully used, to give a more or less yellow tint, and impede the transmission of light through the glass.

Miscellaneous.—General maxims,—such as those which mention the virtues of patience, of keeping on learning, and of being amiable under failures,—are by common consent of the utmost value, especially to beginners in photography. An amateur will find that plenty of the discipline, which is the purpose of life and its occupations, is likely to come in his way. The sun will not shine for a whole day,—or, when the watch is not vigilant for a moment, will open a joint in a changing-box, and adorn each interesting negative with one or more comet-like forms,—or do some other playful deed. A plate with a view on it will be used again with strange results; the uncoated side of another plate will be turned towards the lens. A whole set of dry plates will prove, in an unexplained way, useless; and perhaps he will refuse to be comforted, although he prepared them himself. Chemical, green or red fog will appear on one or another of another set of plates; with, for variety, blistering, frilling, spots, streaks, scratchings, yellow veil, yellow fog, or halation. Prints which he has given away in the pride of his heart will turn up from time to time; and, each time in ghastlier pallor, accuse him of perfunctory washing.

The early days will, however, pass away with a decent rapidity. There are few things more pleasing than to observe the affectionate friendship between a capable old hand and his camera, tripod, and plates, all proved thoroughly during long practice; the instrument might be praised, —in verse,—for seeming as eager as its master. This facility,—acquired with much difficulty, and so easily lost,—appears to some people very dangerous; they assert that, instead of remaining a good servant, the art often succeeds in bringing its master into subjection. Used as helps to study, and for the rapid collection of information for reference, there can be little risk. If a student sketches and measures none the less, and photographs as well, he has gained the service of additional hands and eyes. These remarks have been strictly limited to showing the cost in time and money of acquiring and making use of the services of such additional members.

The ethoxo light was used for the lantern by which the photographic slides were exhibited. Gas-bags, pressure-boards, weights, &c., always bulky and unsightly, and very often inconvenient to the spectators, were thus entirely dispensed with. Being under pressure of 600 lb. to the square inch, or forty atmospheres, sufficient oxygen gas is stored in an iron bottle only 4½ in. diameter and 2 ft. 2 in. long. A regulator, invented by Messrs. Oakley & Beard, of 202, Grange-road, S.E., was screwed upon the bottle so as to obtain the proper consuming pressure, and a portion of the gas passed direct to the jet, and another portion passed over ether, saturated with it, and then carried to the jet. The method of supplying gas to the jet proved very efficient,—the light being as steady as any before seen.

[Of the discussion which followed we will give a brief report in our next.]

Proposed New Clubhouse at Swansea.—The Conservatives of Swansea town and district have formed a limited company for the purpose of providing a clubhouse for the members of the party. Negotiations are nearly completed for the purchase of a suitable site,—45, Wind-street, which is freehold property,—upon which it is proposed to erect the clubhouse. Plans for the erection of the building, which have been prepared by Mr. T. P. Martin, architect, have been approved of.

Surveyorship, Fulham.—On Thursday, the 11th inst., Mr. F. W. J. Palmer, Assistant Surveyor to the town of Folkestone, was appointed Assistant Surveyor to the newly-formed Vestry of Fulham. There were 187 candidates for the appointment.

Illustrations.

EXAMINATION HALL FOR THE COLLEGES OF PHYSICIANS AND SURGEONS.

THIS building (of which we this week give view and plans) is to be erected by the Royal Colleges of Physicians and Surgeons of London, and will afford accommodation for the examination of six hundred medical students at one time. It is on the Duchy of Lancaster land, and faces the Victoria Embankment Gardens. It will be in the Italian style of architecture, and built of red brick and Portland stone. The basement is spacious, and contains rooms for museum, caretakers, &c. On the ground-floor are clerks' and secretary's offices, and waiting-room and examiners' room, and three large examination-rooms. On the first floor, one large examination-room, 100 ft. by 30 ft., capable of being divided in half; and also two other examination-rooms, each 60 ft. by 21 ft. The second floor has similar accommodation, and on the third floor are two large chemical examination-rooms and two anatomical examination-rooms. Lifts and other accommodation are provided on each side of the building.

Portions of the old Savoy Palace walls were discovered in excavating, and some old tiles and other articles have been discovered, and are deposited in the Duchy of Lancaster office.

The Queen has graciously offered to lay the foundation-stone on the 24th inst., which will be on the south end of the east wing, and will be of white Balmoral granite, with these words on it, gilt:—

VICTORIA,
QUEEN OF GREAT BRITAIN AND IRELAND,
EMPRESS OF INDIA,
LAID WITH HER OWN HAND
THIS FOUNDATION STONE,
24TH MARCH, 1886.

The trowel will be silver gilt, the mallet and level made from the old oak of the Savoy Palace.

The new building occupies the front portion of the land, and on the back the future extension is proposed to take place.

The architect is Mr. Stephen Salter, and the builders Messrs. Higgs & Hill, of South Lambeth. The amount of the contract is 29,070*l*.

BIRMINGHAM ASSIZE COURTS.

SKETCH COMPETITION DESIGNS.

ONE of the two sketch designs given this week was one of three submitted by Mr. John P. Seddon, of London, and Mr. John Coates Carter, of Cardiff, under the mottoes "Castor," "Castor and Pollux," and "Pollux." It resembles generally that of Mr. Waterhouse in the disposition of the courts. Internal areas are given in sufficient abundance to provide every room and each corridor with windows at the usual levels, as well as top lighting by skylights, so that every portion of the building would be supplied with air and light. Each court has the whole of the rooms required in connexion with it in convenient proximity, and those appropriated for witnesses immediately wanted, are, in each case, exactly opposite the doorway to the court by which they would have to enter. Those for the jury are upon the other side of the court in each case, as is desirable. There are separate entrances for the Bar and Judges, and a grand central entrance from Corporation-street for the public having business in the courts, and another distinct one for the common public, giving access to the galleries of the courts only. J. P. S.

The other design, by Mr. H. H. Statham, is planned on the principle of classifying the various rooms in groups so that each corridor may have its own speciality. The magistrates' rooms and the officers and witnesses connected with their courts are all arranged on the right of the hall, the magistrates' executive departments being entirely combined around their special corridor. The third court is similarly treated on the left of the hall. At the top of the hall the right-hand passage gives access to the Criminal Court corridor, the left hand to the Civil Court corridor and to solicitors' rooms, the barristers holding the cross corridor at the top. The consultation-rooms are arranged and number along a "Consultation-room Corridor" on the left of the plan, so that the room named for an appointment could be at once found. The steps at the top of the hall lead to the level of the judges' retiring-rooms and the sheriffs' room, which is placed between them, the offices of the Clerk of Indictments and Clerk of the Crown being close to the foot of this stair. The judges are provided with a perfectly distinct entrance and private corridor on the first-floor level, entering from the higher level at Newton-street and descending a few steps to the intermediate level of their rooms. The rooms for witnesses immediately wanted open directly into the Courts.

It was proposed to carry on ventilation and heating simultaneously, by mechanical propulsion of air through chambers intermediate between the ground-floor and the basement rooms, and in the large courts by basement passages; the air propelled by fans through water-sprays, and then through canvas sieves (removable and washable) and through the floors or through tubes into the apartments, the air being first warmed (in winter) by steam-pipes placed in the air-chambers. Air extracts from the top of all courts and one-story rooms. The areas from which the air was drawn to be lined with glazed brick, and the air-ducts lined with cement to a smooth face; the whole system of air supply to be capable of easy and efficient cleansing. The extract from the centre hall to be by an upcast shaft in the circular turret, the lower part of which contains a staircase.

A novelty in the arrangements is the suggestion of lifts from the prisoners' cells to the docks of the courts: a plan certainly more convenient than sending police and prisoners up a narrow winding staircase, and taking up much less room. An attempt has been made at a special external treatment of the prison cells block, giving it a bastion-like character.

H. H. S.

COMPTON WINYATES.

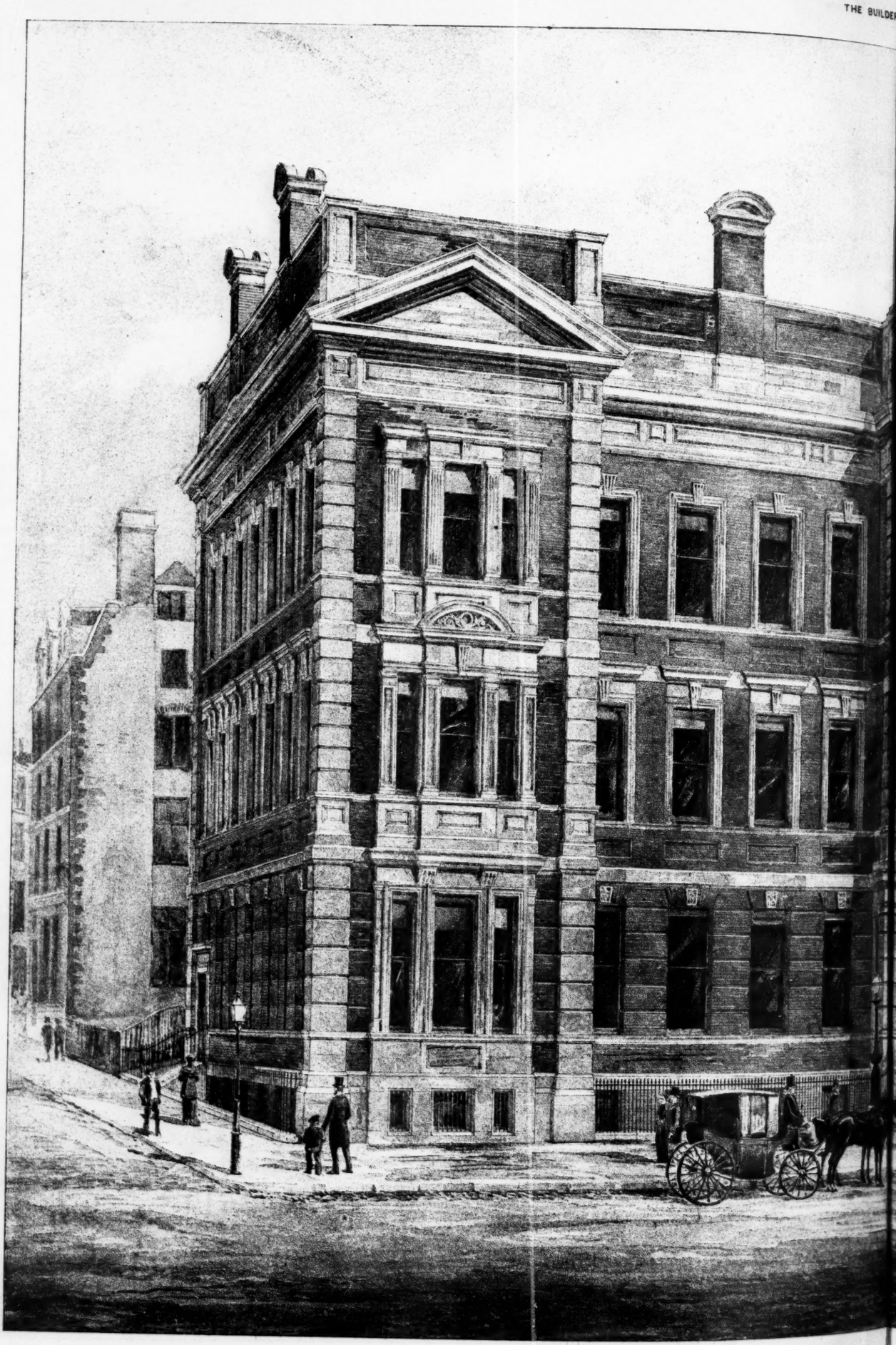
WE give this week seven illustrations of the charming house at Compton Winyates,* reproduced from photographs taken by Mr. J. L. Robinson, of Dublin, the well-known architect, who has for about eighteen years used photography as a help in studies of architecture. The photographs were among the large number shown by Mr. S. Flint Clarkson at the last meeting of the Architectural Association, when he read the paper printed elsewhere in this number.

Compton Winyates is the best accepted form of the name,—though Wyniates, Winyate, and other spellings are used occasionally,—it belongs to the Marquis of Northampton, and is at the present time used as a residence by Lord William Compton. Situated in one of the most westerly of the hollows in the high ground, about a mile to the west of the division between Oxfordshire and Warwickshire,—Camden, and no doubt the people of his time, wrote of it as "Compton-in-the-Hole," to distinguish it from several other Comptons hereabouts. The high ground is, in fact, part of the line of hills, which some people call the northern extension of the Cotswolds. A tourist, with a liking for roads along hills, might begin at Edgehill, the scene of the battle of 1642, which is about five miles north of Compton Winyates, and work down in a south-westerly and leisurely way by it, Brailes, the Rollerich Stones, and then by the true Cotswolds of Gloucestershire, through the middle of that county from Chipping Campden to Bath. In the early part of his journey he would look down on the streams which go to feed the Warwickshire Avon and would finish at another Avon,—that which divides Somerset from Gloucestershire.

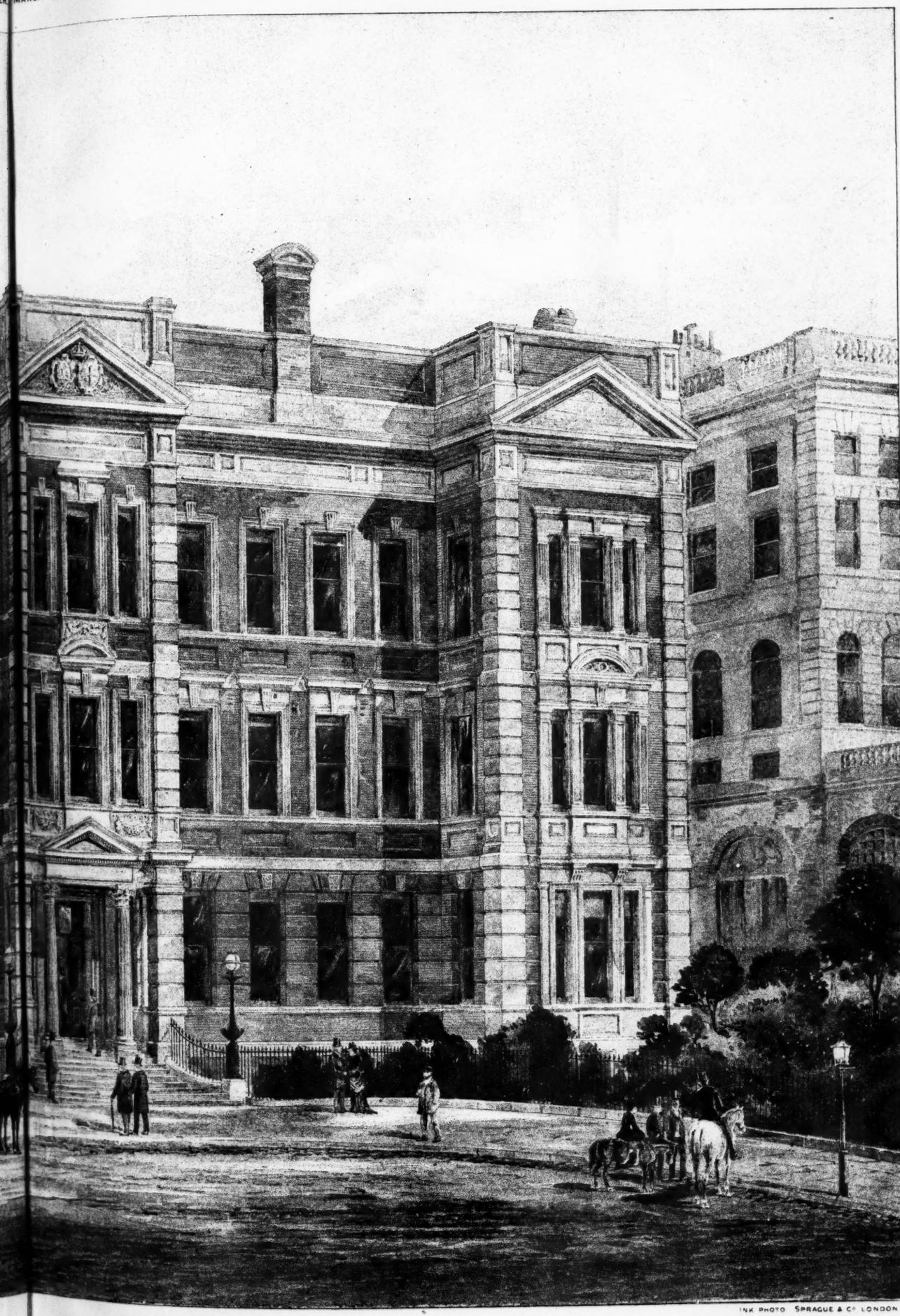
The waters from the quick slopes round Compton are received in a piece of water near the house, and go thence in a little stream, then into the Stour, and then into the Avon, a mile or two from Stratford. The lowest point in the rising ground round "the hole" is thus, of course, on the west,—the side from which the house is approached.

The distance from a railway station keeps down the number of visitors. Kineton is the nearest, and it is said to be about nine miles off by cross-roads through "the Feldon" to the west of the hills. Camden, writing before 1607, put down pleasant words, which in the old translation recall in our time the memory

* We gave two or three sketches from this house at the time of the last Architectural Association excursion, but these photographs give more varied illustrations of it, and as Mr. Clarkson had selected them as those which he wished published to illustrate his paper on "Architectural Photographs by Amateurs," they will be in place here.



NEW EXAMINATION HALLS FOR THE ROYAL COLLEGES OF PHYSICIANS AND SURGE



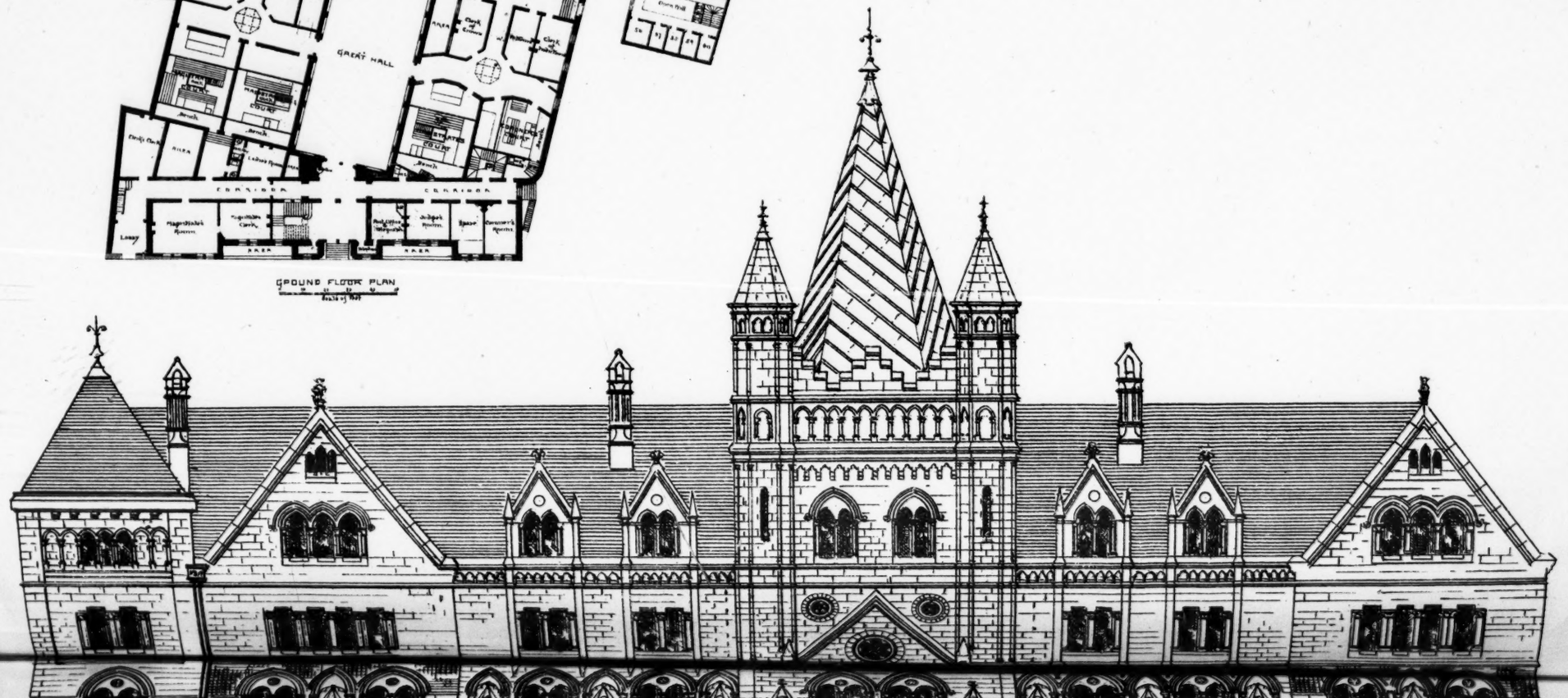
INK PHOTO. SPRAGUE & Co LONDON

S AND SURGEONS, ON THE THAMES EMBANKMENT.—Mr. S. Salter, F.R.I.B.A., Architect.

BIRMINGHAM LAW COURTS.

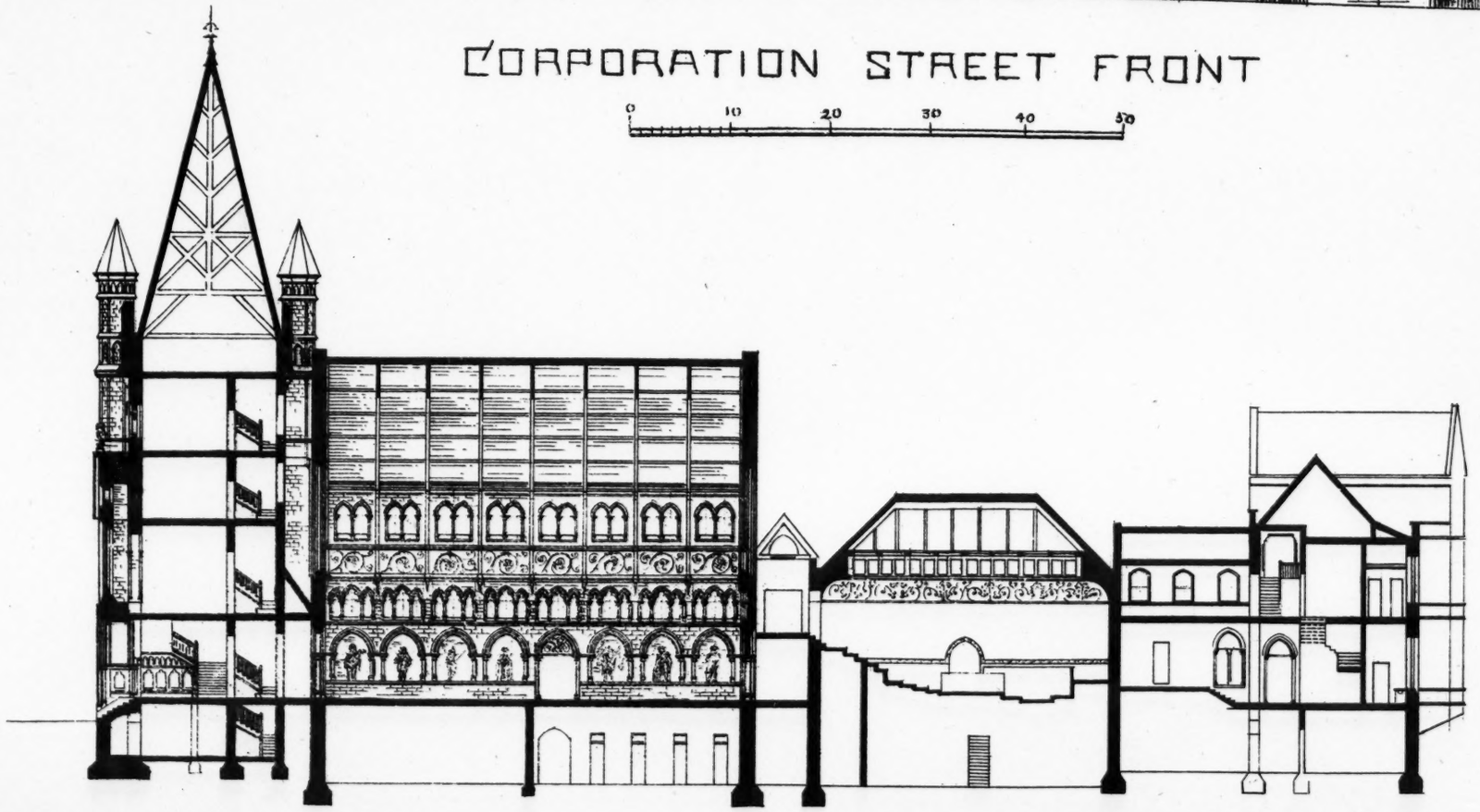
SKETCH DESIGN BY "Castor & Pollux."

GROUND FLOOR PLAN



CORPORATION STREET FRONT

0 10 20 30 40 50



Scale of Feet

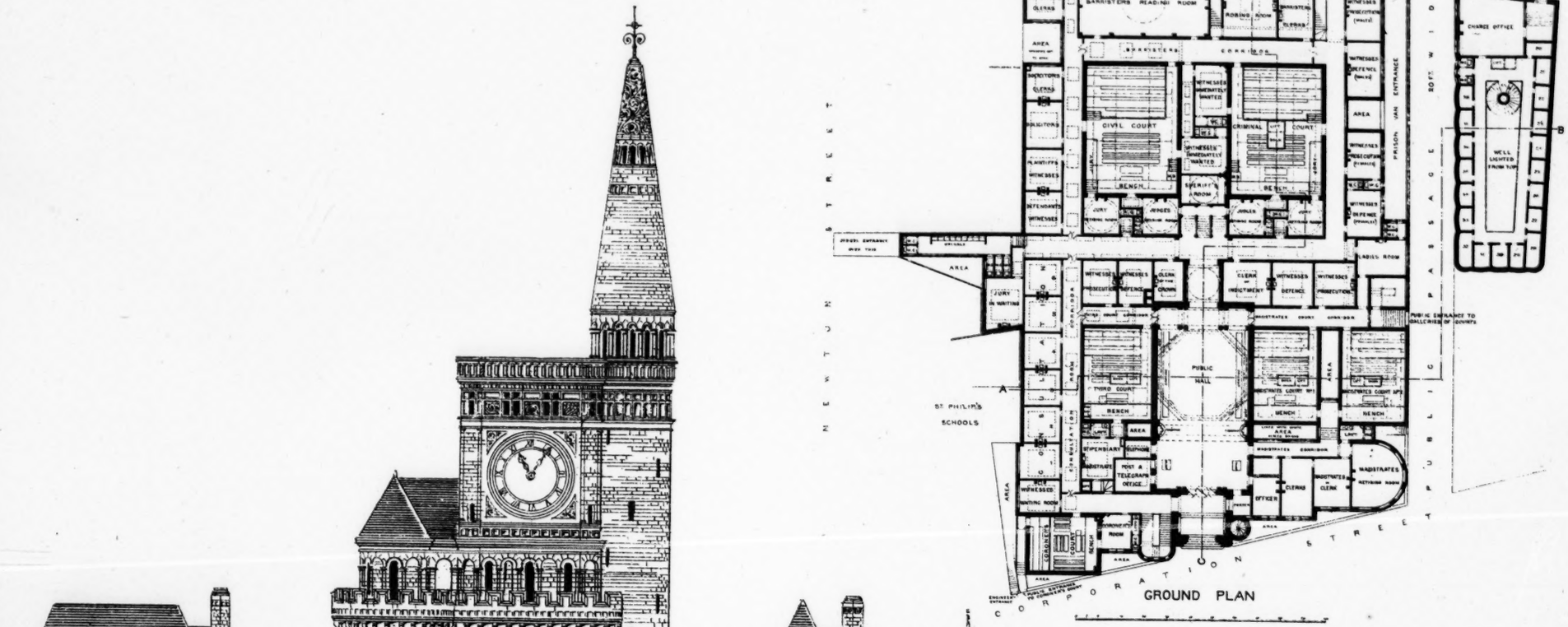
SECTION THROUGH HALL COURT &c.

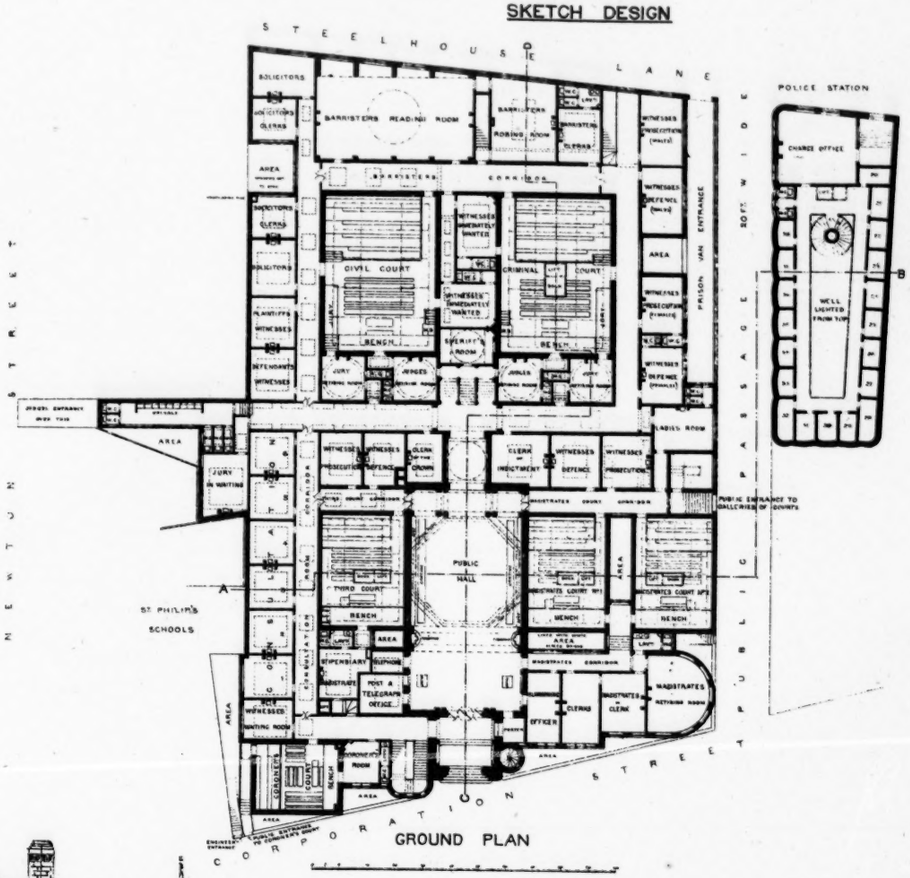
PHOTO-LITHO. SPRAGUE & Co LONDON.

BIRMINGHAM LAW COURTS COMPETITION.—One of the Sketch Designs submitted by Mr. J. P. Seddon, F.R.I.B.A. and J. Coates Carter.

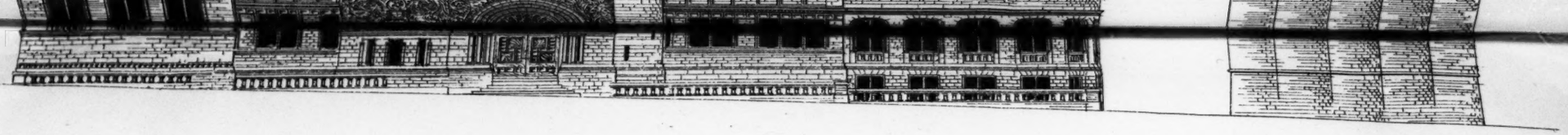
BIRMINGHAM LAW COURTS

SKETCH DESIGN



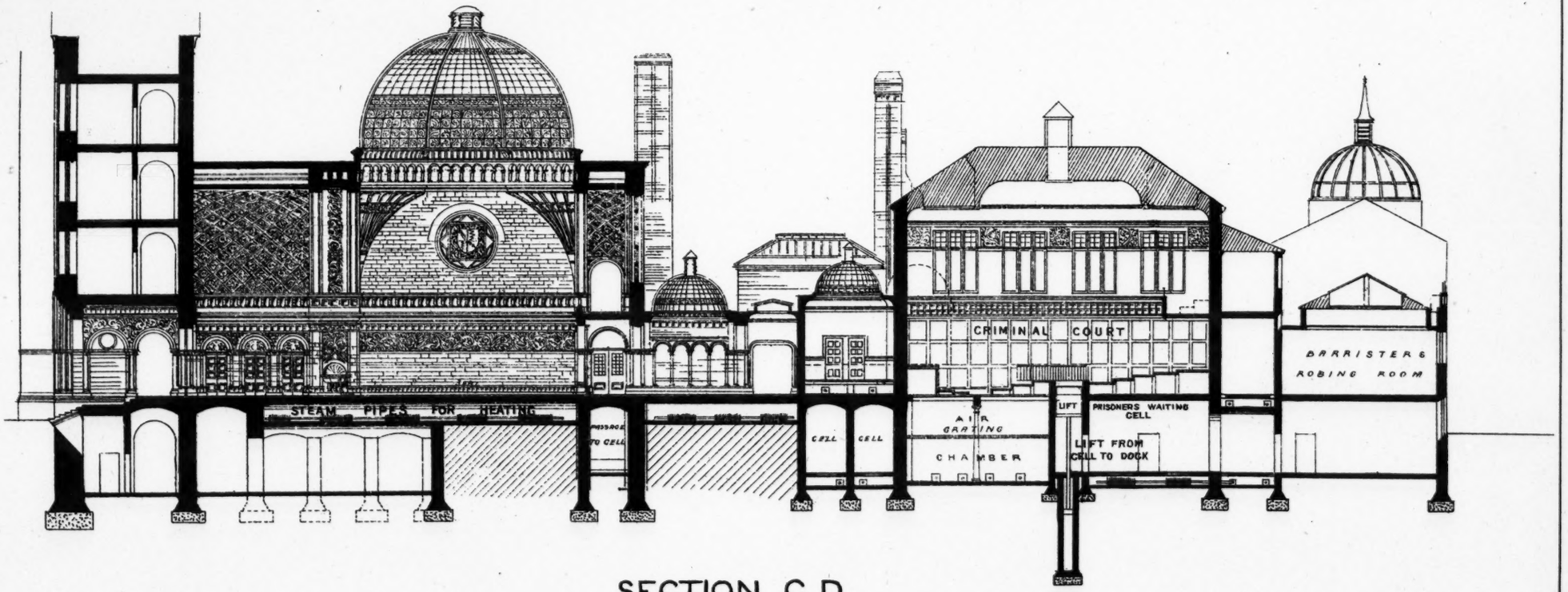


GROUND PLAN



ELEVATION— END OF POLICE CELLS

0 10 20 30 40 50 60 70 80 90 100 FEET.



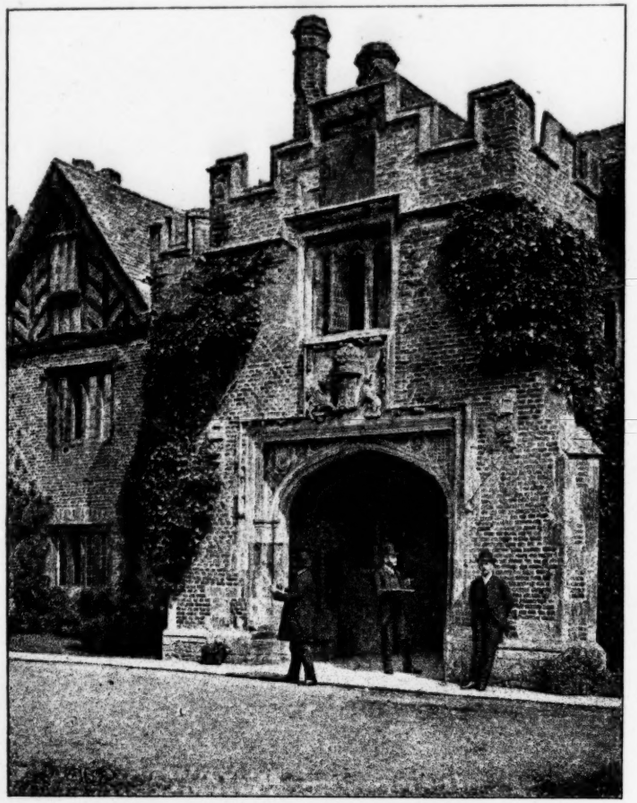
SECTION C.D.

0 5 0 10 20 30 40 50 60 70 80 90 100

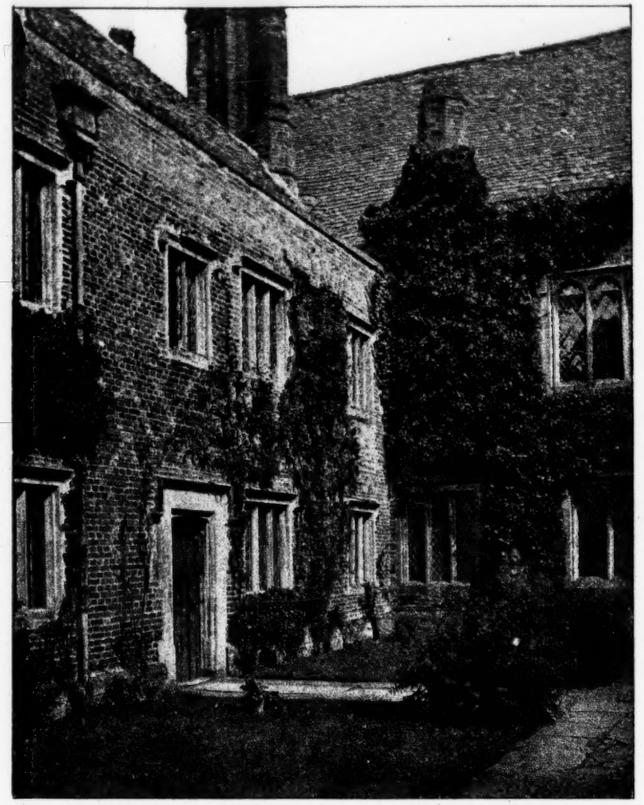
"DISTRIBUTION"

PHOTO-LITHO. SPRAGUE & Co. LONDON.

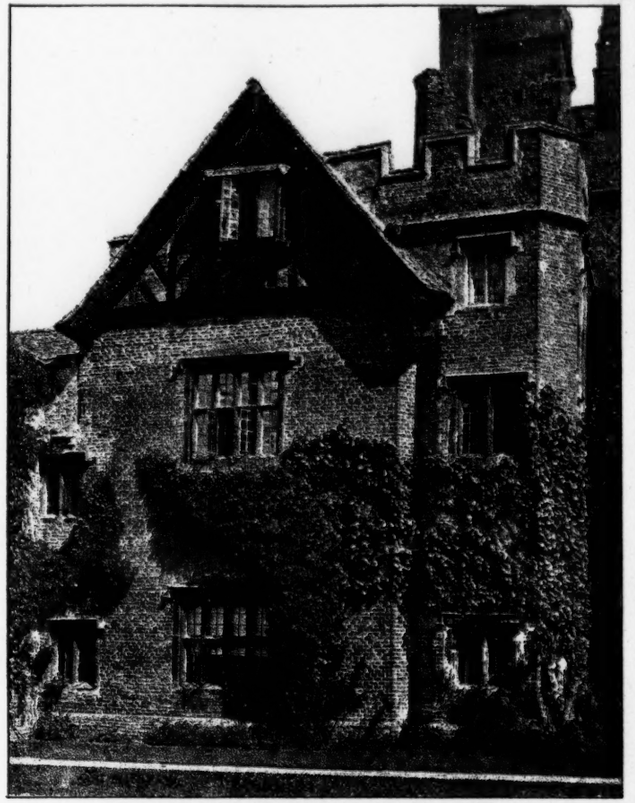
BIRMINGHAM LAW COURTS COMPETITION.—SKETCH DESIGN SUBMITTED BY MR. H. H. STATHAM, F.R.I.B.A.



ENTRANCE TO QUADRANGLE.

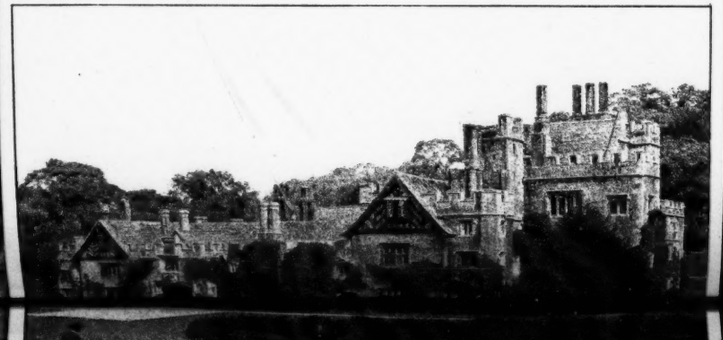


OFFICES. HALL.



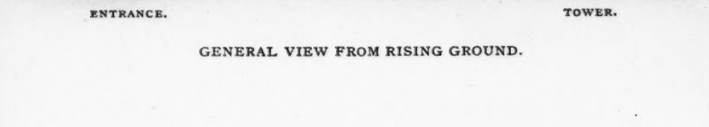
GABLE OF ENTRANCE FRONT (NEAREST THE TOWER).

IN THE QUADRANGLE.



IN THE QUADRANGLE.

ENTRANCE.



TOWER.

BAY WINDOW OF HALL.

GENERAL VIEW FROM RISING GROUND.

THE CHAPEL WITH SIDE OF TOWER BEYOND.

TOWER.

CHAPEL.

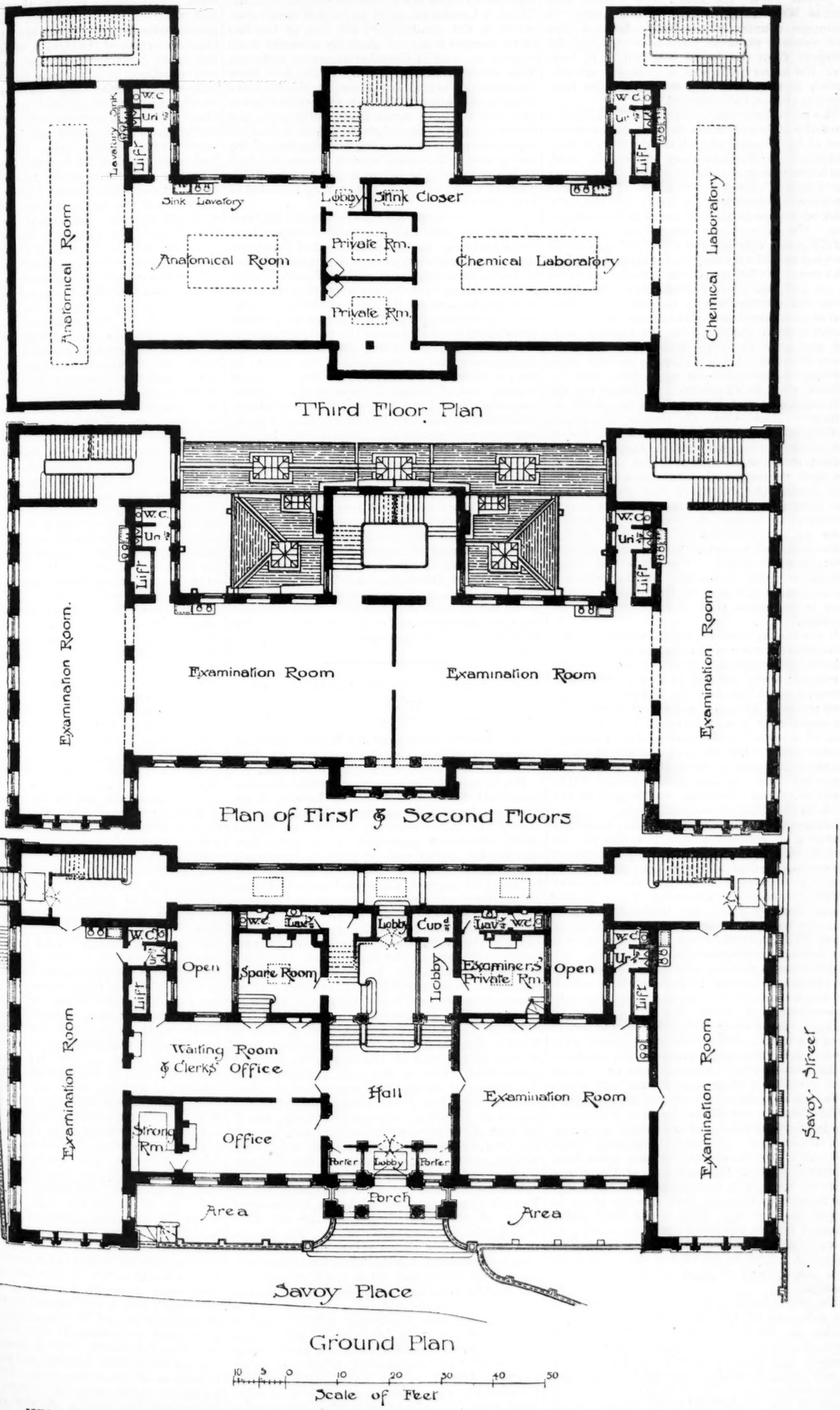
VIEW FROM THE LAWN.

STAIRCASE.

INK-PHOTO. SPRAGUE & Cº. LONDON.

VIEWS OF COMPTON WINYATES, WARWICKSHIRE.

From Photographs by an Architect, used as Illustrations to a paper on "Architectural Photography by Amateurs," (Architectural Association, March 12th, 1886.)



NEW EXAMINATION HALLS FOR THE ROYAL COLLEGES OF PHYSICIANS AND SURGEONS.

of joyous days. He found the Feldon (the part of Warwickshire south of the Avon), "a champain country, whose fertile fields of corn and verdant pastures yield a most delightful prospect from the top of Edgehill." If, however, the larger roads and a prospect are preferred, it must be fully a dozen miles from Kineton station to the house.

The post-Restoration church is a little further down the hollow than the house,—to the north-west of it. The old church is said to have been destroyed by Parliamentary soldiers in 1646. The house was garrisoned by them, as its owner was a zealous partisan of Charles. The present church was commenced in 1663; and the date, 1665, on a pipe-head, may point to its completion. We gave in our last volume (vol. xlix., p. 237) some extracts from old account-books showing that the cost of the building started in 1663 was about 300*l.*, and may mention here that on pp. 237, 332, 337 of that volume are some notes and illustrations as to the house also. The church has two equal naves,—the arcade between them abutting on the eastern wall, and the altar being placed under the point where it abuts. An intention to deviate from ordinary plans has been suggested; but instances, such as Caythorpe, a church on the Cliff-road, south of Lincoln, may be quoted as telling against this. Caythorpe is almost entirely of geometrical date, and has also a double nave, the easternmost arch abutting against the central tower, above the apex of the west crossing arch, and the westernmost arch hitting the centre of the gable of the west front; for at Caythorpe one span covers the two equal naves. At Compton the arcade abuts at the west end on the centre of the tower arch, and is carried on a combination of keystone and corbel. The date and many oddities of detail make the building piquant; but candour might lead to the confession that there is not much that is architecturally interesting.

Of the house, however, candid visitors always tell a different tale; and it has been known to make so favourable an impression as to distance all competitors of its age and size. Situation, history, and colour may do a good deal, but there are good grouping and detail as well,—so that everything is in its favour. The plan consists of a small quadrangle;—the buildings round it being,—the offices on the left on entering, the hall opposite the entrance porch, and rooms and chapel on the right. Henry VIII., when he visited Compton, was lodged in the rooms on the right of the quadrangle.

Shields on the doorway of the entrance-porch,—now reached across the site of the filled-up moat,—give approximately the date of the erection,—that is, somewhere about 1519; for the pomegranate of Aragon, the castles of Castile, the rose and portcullis of the Tudors appear side by side. Sir William Compton, from boyhood the friend and companion of Henry VIII., built the house, and since he lived in it not many alterations have been made. He used brick of a rich red very liberally for walls and chimneys,—diapering some surfaces with a few black headers; stone he used more sparingly in windows and doors, and for quoins and copings. Stone slates with thick ragged edges cover the roofs. One of the stone-paved pathways crossing the court leads to the entrance to the hall,—a simple doorway, not very much more prominent than that on the left, which leads into the offices. The founder, it is stated, pulled down a castellated house at Fulbrooke, also in Warwickshire, and carried off the materials to Compton. Fulbrooke is between Stratford and Warwick,—perhaps fifteen miles from Compton, so that the situation of the places offers no obstacle to the credibility of the story. The fact that Fulbrooke Park was the place, as people used to say, from which Shakspeare removed Justice Shallow's deer, has nothing to do with the story of the bay windows and other materials, which to be of any use must have been taken away at least seventy years previously.

The bay window is in the usual position at he daïs end of the hall. The stonework is earlier in character of detail than in the parts adjoining; and, although the general effect is very pleasing, some parts have a look of not being specially prepared for the place which they occupy. The little arcade above the heads of the window-lights,—a feature which has been repeated at Wroxton Abbey, and in other recent work,—has, for instance, a shield and other ornamentation in one division only, but that division is not over the central mullion. There is besides no reply to its rich detail elsewhere in the quadrangle; the line of the top of its parapet is carried along by a simple stone coping, but none of the other lines are continued. The other windows just by in the hall have cinquefoiled heads, but those in the bay are plain four-centred. The oak roof of the hall is also said to have come from Fulbrooke; and there is certainly an enigmatical look in it also, especially about the spacing and the feet of the wall-pieces. The wood screen across the hall at the end next the offices is a rich and notable piece of work,—some of the carving full of skill and spirit.

Canonbury Tower also belongs to the Marquis of Northampton, and was made to contribute some years ago to the adornment of Compton. A large oak chimneypiece was brought hither, and some other fittings. Sir Digby Wyatt directed these works, and put the bay window on the staircase which shows on the right of the large view, and is, particularly from the staircase side, a most pleasing addition. Among the pretty things on the outside of the building, the two gables with timber work, one on each side of the porch, in the entrance front, merit a high place, having a good deal of design in them in the cornices, bargeboards, and the little bracketed windows. The designer was, happily, not afraid of a good-sized piece of brick wall. There is a satisfactory breadth in the walls under these gables and elsewhere, and, consequently, an easy restful look; but the happy man was not oppressed by the cry for very ample lighting of all rooms and spaces, as the modern architect very properly is.

The brick chimneys, in every variety from plain octagon to rather wild and rather involved forms, are among the noteworthy features: they may be compared with those at Hampton Court, Chenies, East Barsham, &c. The chapel, the plaster ceilings, carving, tapestry hangings, and so on, would deserve notice if we were attempting a complete account, instead of simply putting together a few remarks apropos of the illustrations.

FREE LECTURES TO ARTISANS AT CARPENTERS' HALL.

THE ARCHITECTURE OF CITY BUILDINGS.

THIS was the subject of the fourth lecture of this course, which was delivered on the 10th inst. by Mr. T. Chatfeild Clarke, F.R.I.B.A.

Mr. Chatfeild Clarke commenced by drawing a contrast between the City of London of to-day and the City as it existed in the time of Henry II. After glancing at the lost opportunity which was presented by the Great Fire of 1666 for laying out the City on some such comprehensive plan as that prepared by Wren, he came to a much more modern period, viz., about fifty years ago, when two great improvements were made in the City, the formation of Moorgate-street and King William-street in connexion with the approaches to the new London Bridge, of the architecture of which streets it could only be said that it was tame and uninteresting in character. After mentioning St. Paul's Cathedral, the Bank of England, the Mansion House, many of the halls of the City companies, and several of Wren's churches, as monuments which were worthy of any city in the world, the lecturer proceeded to refer to the great changes which the street and other improvements of the last forty or forty-five years have wrought in the aspect of the City. Cannon-street was one of the first of the great arteries which cut through the City, the buildings on the south side being wholly new. The formation of the Holborn Viaduct and its approaches, the erection of the new City markets, and the formation of Queen Victoria-street, together with the widening of many of the most important of the City thoroughfares, and, last of all, the formation of the new thoroughfare through East-cheap, constituted a series of undertakings on a large scale which had given much opportunity for architectural development. One special feature had been adopted, notably in the Mincing-lane and Mark-lane neighbourhoods, that of utilising the frontages of old houses, often the former residences as well as counting-houses of merchant-princes, rebuilding them, but marrying them to a lot of back land, and forming alleys or passages through to an adjacent street, by such means giving much value to back land; for nothing was more noteworthy of the trade of the City than the clinging of certain trades or markets to a very limited area, giving special value to the property there, and determining its use and adaptation with great particularity. It was true that owing to the narrowness of the streets, which, again, was due to the great value of land, many a worthy and excellent building was insufficiently seen, but, nevertheless, they were not scamped on that account or pinched in the character of the design or the material with which they were executed. What could not be seen was as worthy as what was seen. One cause which had contributed much to good building in the City was to be found in the fact that the value of the ground bore a much higher proportion to the value of the whole site than did the building to be put upon it. Lamentable as it was to feel that it had been necessary to destroy many a sound and well-built building, occupied in earlier times by a noble family and later by a merchant-prince, the ground had become so valuable,—in special sites reaching 45*l.* per foot super,—that the cost of replacing the building with one economical in its development of the space and complete in its lighting, with numbers of floors and every disposition for business, could not be avoided. The problem of all street building consisted in the adaptability of the buildings to the wants, the climate, and the surroundings of the particular business to be carried on. Now, to combine the needs of buildings with the simple principles of design, such as providing such a sufficiency of substructure as not to make the building apparently weak in the lower portion, while not sacrificing light in that portion where it was least abundant, to let opening follow over opening, &c., was a problem not always easy of solution. The treatment of the design, however simple, and in whatever style, should bear the relation not only of the scale of the whole to the parts, but a subordination of the lesser features to the ruling lines of the whole. Pre-eminently in City buildings, there were several principal classes, such as banks, insurance offices, warehouses, shops, and offices, each class having its special requirements, while there were some factors common to all. The lecturer named a great many of the principal buildings of these types which have been erected of late years in the City, generally with commendation, pointing out that in some instances good designs had been marred by the exigencies of the law of light. We regret that we have not space to devote to this part of the paper. In conclusion, he observed that he had shown that within the limits of a square mile or upwards there was an amount of really good modern design worthy of the study of all who were interested in the art of architecture. The question that arose in his mind was, Does this amount of work, carefully and conscientiously thought-out, receive at the hands of the public that amount of recognition that it ought to do, and if not, why not? It could not be denied that it had almost been the fashion of late years, in certain circles and journals, to decry the works of modern architects as wanting in fitness, as ill-adapted to their uses, and as having been in many cases carried out without a conscientious regard either to cost or to the details of modern wants. Now he took the liberty boldly to deny in the main that there was any shadow of justification for such charges. Admitting some unfortunate exceptions, he contended that an examination of the immense amount of building work executed in the City of London alone would give the easiest refutation to such statements. If we compared for one moment the healthiness, the fitness, and the general disposition of modern premises with those in which our forefathers lived and worked, and if we looked at the careful and economical disposition of the plan, the use of materials, and the desire to adopt the scientific classes of construction in iron and otherwise, we should see that there was no comparison between the old and new; and a wide knowledge of men in the architectural profession would suffice to convince any one that they were earnestly desirous of carrying out their work with a sole regard to the interests of their clients, and in many cases (though inadequately compensated) with a strict eye to the financial results of their works, and with due regard to their bearing on the health and happiness of the community. Of course, the public at large, who, as a rule, generously recognised the merits of any distinguished designer, had not always at hand the means of knowing how crippled he might have been, and how difficult it was to get assent

to plans and designs which, to be fully understood at first, must be judged of only by those who had technical knowledge of drawings; but in the end, a conscientious and single eye to the interests of the client or the public would be generously recognised and appreciated, and the passing mood or fashion of decrying the labours of those who were often working under limitations not understood was probably one of those evanescent forms of shallow criticism which would die out. Nevertheless, the student of architectural art must be warned that the sacrifice of utility to style, the choice of such style where wholly inappropriate to the class or position of the building, and any want of care in the estimates, or carelessness in the construction or superintendence, would justly not only bring on his head dissatisfaction and loss, but would tend to keep alive in the public mind a conviction that it was better to get on without an architect, and to trust themselves unaided to the building contractor. It should be the aim of every young practitioner especially, by care, talent, and energy, to dispel such an illusion and to raise the character of the profession of which he was a member. The lecturer's final word was one of satisfaction that that ancient guild was taking up the thread of the work of art-education, so fit and right in connexion with the Company, and by such means re-establishing in the minds of a great public those claims of fitness and ability to do most useful work in our great community.

On Wednesday evening last the fifth lecture of the series was given by Mr. John Slater, B.A., who took for his subject "Concrete." The first portion of this will be found on another page.

ARCHITECTURAL SOCIETIES.

Manchester Architectural Association. — At the general meeting of this Association, on the 16th inst., Mr. L. Booth, President, in the chair, Mr. John Holden, President of the Manchester Society of Architects, read a paper on "The Duties and Requirements of an Architect's Profession." He said that as the standard of education rose in respect to the general public, so would it rise with the architectural profession. He then detailed and described many of the practical questions upon which architects are often consulted, and said it had always been his opinion that the architect was the proper person to take out the quantities for his own works. Such a course was of great advantage both to the owner and also to the builder. Many pupils in London offices completed their articles without knowing anything about quantities, which he was glad to say was not the case in Manchester. In conclusion, he said he looked forward to the time when the Fellowship of the Institute would be considered one of the aims of an architect's life. The Institute, from its age and from the number of its members, must of necessity exercise very great influence over the profession throughout the country. If the non-Metropolitan Fellows were to be bound by its regulations, they should have some voice in framing or making the same. A discussion followed, in which Messrs. Mee, Talbot, Colley, Hodgson, Mould, and the chairman took part.

Royal Institute of the Architects of Ireland.— At the usual monthly Council meeting of the above, held on the 1st inst., Mr. J. R. Carroll, Fellow, in the chair (also present, Messrs. J. J. O'Callaghan, Wm. Mitchell, S. Symes, hon. treasurer, Albert E. Murray, hon. secretary), after the general business was concluded, it was resolved that a deputation from the Institute should wait on the Lord-Lieutenant, and present him with an address of welcome, Messrs. J. R. Carroll, T. Drew, and Albert E. Murray, hon. secretary, to form a sub-committee to draw up the address, which was duly presented on the 15th inst. The address contained the following passage:—

"It is a source of great satisfaction to the architects of this country to observe that successive Governments have shown an increasing disposition to employ the best independent talent available to design important public buildings, rather than by a system of departmental centralisation to lose the advantages to be obtained from varied talents working in different schools of thought. We can, with pride and satisfaction, point to some public edifices in this city, erected under the former system, not unworthy of any country, and to an important work now being carried on, which, it is believed, will not be less deserving of praise."

The Lord-Lieutenant, in his reply, accepted the position of vice-patron of the Institute.

THE DISPOSAL OF THE METROPOLITAN SEWAGE.

AN important report on this subject was presented to the Metropolitan Board of Works at its meeting on the 12th inst. The following are the principal passages:—

"Immediately after the publication of the first Report of the Royal Commission on Sewage Discharge, the Board instructed their Engineer and Chemist to institute a series of experiments for the purpose of ascertaining the best method of complying with the recommendations of the Commission, and voted the sum of 1,000*l.* for the purpose of those experiments, to assist in which Dr. Dupré, F.R.S., was retained.

As a preliminary measure, the Chemist to the Board, Mr. Dibdin, and Dr. Dupré commenced a series of experiments in their respective laboratories, and arrived at certain definite conclusions which served as a guide to the trials subsequently made at the Western Pumping Station, Pimlico. At this place apparatus was erected for the treatment of successive quantities of 1,000 gallons of sewage, which was subsequently arranged for the larger quantities of 100,000 and 250,000 gallons.

These larger experiments were conducted for about three months, and demonstrated that chemical precipitation of the solid matters held in suspension can be effected by the addition of various re-agents, but that no practical advantage accrued from the addition to the sewage of more precipitating matters than are really necessary for facilitating the natural tendency of the solids to deposit: the effect of adding large quantities of chemicals ensuring only a more perfect clarification without materially affecting the *soluble* constituents of the sewage.

This primary point having been determined, attention was next given to the collection and disposal of the sludge. Although at first sight this appeared to be a tolerably simple matter, the enormous quantity of London sewage rendered it imperative that more precise data should be obtained as to the quantity to be dealt with per day, its adaptability for transit, pressing, and ultimate disposal.

The evidence given before the Commission was of so conflicting a character that it was felt that nothing short of a prolonged series of experiments on a tolerably large scale, extending over some months, and including day and night, would afford the information necessary before working plans could be drawn up for the erection of plant for treating the whole of the sewage.

The Board therefore voted a sum of 5,000*l.* in November, 1884, for the erection of works at the Crossness Outfall for the treatment of one million gallons of sewage daily, and the pressing of the sludge obtained therefrom. These works were accordingly erected, and while special attention was directed to the sludge, numerous experiments were made with regard to the chemicals employed for precipitation. The results of these have confirmed those first arrived at, viz., that the sewage can be sufficiently clarified by the addition of 3·7 grains of lime and 1·0 grain of proto-sulphate of iron to each gallon of sewage, and by subsidence in settling-tanks during a period of from one to two hours. In addition to the removal of the solids, the grosser odours of the sewage are destroyed, and the foul and offensive appearance removed.

The accompanying reports of four very eminent chemists (one of whom was a member of the Royal Commission on the Metropolitan Sewage Discharge) are a sufficient guarantee as to the satisfactory condition of the effluent after the above treatment of the sewage.

The two reports are as follow:—

'October 27, 1885.

To the Sub-Committee on Sewage Disposal of the Metropolitan Board of Works.

Gentlemen,—In response to the question submitted to us for consideration through Mr. Dibdin, whether the treatment of metropolitan sewage with lime and sulphate of iron, in the proportion of 3·7 grains of the former to one grain of the latter to each gallon of sewage, furnishes an effluent of such a character that we could recommend its discharge into the river at all states of the tide, we have, in the first place, to express our regrets that the shortness of time within which it is desired to receive from us an expression of opinion has not allowed of our making such a comprehensive examination of the matter as its importance would have rendered desirable.

We have, however, witnessed at Crossness the treatment of the sewage in the manner indicated, and have made certain experiments with effluents obtained thereby, and we now submit the following statements on the subject:—

1. We are of opinion that the discharge into the river of such an effluent as is obtained by the treatment in question, and after such subsidence of the solid matters as is practically attainable, would be a very great gain over the discharge of untreated sewage, and that the treatment does, apart from its precipitating action, exert a distinct purifying effect upon the liquid part of the sewage. We consider, however, that the effluent produced by the proposed treatment retains a sufficiently unpleasant odour to prohibit its being discharged into the river during warm weather at all states of the tide.

2. As regards the mere production of a fairly clear effluent our present impression is that little, if any, additional advantage would accrue either from an increase in the proportions of the chemicals specified or from a resort to other chemicals which would act merely as precipitants.

3. We have reason to believe, however, from what we have seen in the way of experiment, that the addition of manganate of soda and sulphuric acid, or of other suitable oxidising agent to the fairly clear effluent obtained by the treatment with lime and sulphate of iron would so far deodorise and purify that effluent as to allow of its being afterwards discharged into the river, throughout the year, at all states of the tide.

4. It is a question whether this supplementary treatment of the said effluent by an oxidising agent may not be dispensed with during the winter months.—We are, &c.,

(Signed) F. A. ABEL,
WM. ODLING,
ALEX. W. WILLIAMSON,
A. DUPRÉ.'

'December 19, 1885.

To the Sub-Committee on Sewage Disposal of the Metropolitan Board of Works.

Gentlemen,—In our report of the 27th October we expressed the following opinion, viz.:—

1. That the discharge into the river of an effluent obtained by the treatment of sewage with lime and sulphate of iron in the proportion of 3·7 grains of the former and one grain of the latter to each gallon of the sewage, and by such subsidence of the solid matter as is practically attainable, would be a very great gain over the discharge of untreated sewage; but that such an effluent retains a sufficiently unpleasant odour to prohibit its being discharged into the river during warm weather at all states of the tide.

2. That so far as regards the mere production of a fairly clear effluent, little, if any, additional advantage would accrue either from an increase in the proportions of the chemicals specified or from a resort to other chemicals, which would act merely as precipitants.

3. That we have reason to believe that the addition of manganate of soda and sulphuric acid, or of other suitable oxidising agent, to the fairly clear effluent obtained in the manner described, would so far deodorise and purify that effluent as to allow of its being afterwards discharged into the river throughout the year at all states of the tide.

4. That it was a question whether this supplementary treatment of the effluent might not be dispensed with during the winter months.

We have nothing additional to observe with regard to statements 1 and 2, but with reference to 4, we have to state that additional observations made by us since the submission of our report have led us to the conclusion that the concurrence during a considerable part of the year of the comparatively low temperature, both of the sewage and of the river into which it is discharged, with the greater dilution of the sewage, renders a supplementary treatment of the fairly clear effluent obtained by the addition of lime and sulphate of iron unnecessary during the periods of such concurrence.

With a view to enable us to speak more definitely on the subject dealt with in statement 3, we have instituted a number of experiments, not only with samples of average sewage, but also with samples representing exceptionally offensive conditions; we have, moreover, carried out our experiments not merely at the ordinary temperature, but also under exceptionally severe conditions as regards maintenance of the sewage and the effluents at elevated temperatures and in confined spaces.

The results of these experiments have led us to the conclusion that, in cases when the supplementary treatment by an oxidising agent of the effluent obtained by the use of lime and sulphate of iron is necessary, the addition of manganate of soda in some proportion ranging between 0·5 grain and 1·5 grain of the crude commercial manganate to one gallon of the effluent, together with sulphuric acid in a proportion corresponding to about one-third of that of the crude manganate used, suffices to deodorise and purify the effluent to such an extent as to render its discharge into the river unobjectionable at all states of the tide.

We therefore recommend:—

1. That the sewage be treated throughout the year with lime and sulphate of iron, in the proportions of 3·7 grains of lime to 1 grain of sulphate of iron (green vitriol) to each gallon of sewage.

2. That whenever it should be found that the fairly clear effluent obtained by that treatment is to any appreciable extent offensive, manganate of soda be added to the effluent in such proportions as are found to be necessary to deprive it of its offensive smell, those proportions to range between 0·5 grain and 1·5 grain (inclusive) of the crude commercial manganate, with sulphuric acid (commercial oil of vitriol), in quantity equal to about one-third of the crude manganate, added.—We are, &c.,

(Signed) F. A. ABEL,
ALEX. W. WILLIAMSON,
WILLIAM ODLING,
A. DUPRÉ.'

For the purpose of pressing the sludge obtained, a 30-inch press was procured from Messrs. Johnson & Co., of Stratford. During the seven months that this has been at work it has pressed 1,787 tons of sludge, which yielded 523 tons of 'cake.' In addition to the sludge thus treated, 1,408 tons have been experimented upon by various means, for the purpose of ascertaining the possibility of getting the sludge into a solid condition without the expense of thus pressing it. The result showed that this had been done to a certain extent; but the time required to make it solid would, during the summer months, render this method objectionable.

One hundred tons of sewage-cake have been burned in a Hoffman's furnace, at the brick works of Messrs. Hughes & Co., at Pluckley,

Kent, and about 200 tons have been burned in various ways at Crossness. The result showed that, while there is but little difficulty in effecting the desired object, the expense of carrying on the system without nuisance would be prohibitory. It, therefore, became obvious that some other method of disposing of the cake, if the sludge is pressed, or of getting rid of the wet sludge, must be adopted, and if it is not removed from the works by farmers and others for manurial purposes the alternatives evidently are, either raising up low-lying land with the cake, or of taking the sludge or cake out to sea, provided that the contradictory evidence on these points could only be met, as before, by direct experiment. The Board, therefore, ordered that one of the compartments of the reservoir at Crossness should be arranged for the treatment of eight million gallons of sewage daily (the one-million gallon works being continued simultaneously) and that the sludge thus resulting from the treatment of nine million gallons of sewage should be used for the purpose of settling many doubtful questions as to its treatment and ultimate disposal. These works are now completed, and will be in operation in a few days. In the meantime, as many conflicting estimates of the cost of carrying the sludge out to sea have been submitted to the Board, advertisements were inserted in the leading daily newspapers inviting plans and estimates for a vessel suitable for that purpose, and in order to induce the leading firms of shipbuilders to compete, the Board offered a premium of 500*l.* for the best proposal in the event of the tender not being accepted. These plans have now been received and are under the consideration of the Board.

As soon as the eight million gallons experiment is at work, advertisements will be issued offering the pressed or unpressed sludge to all persons who may desire it, free of cost,—the object being to ascertain to what extent the sludge may be disposed of by this means.

The Royal Commission recommended that in the event of the sewage being treated by chemical precipitation at the present outfalls, the effluent should be filtered by passing it through land before being discharged into the river. The object of this was evidently to insure the removal of all odour from the effluent, and the possibility of 'secondary fermentation,' as it is called. The great cost attending such a method, and the difficulty of finding suitable land for the purpose in the neighbourhood of the outfalls, induced the Board to ascertain whether the desired object could not be effected by direct treatment of the effluent by means of an oxidising agent which, while effecting immediate deodorisation of the slight sewage odour remaining after the chemical or precipitation, should, at the same time, prevent the redevelopment of offensive gases. This agent has been found in permanganic acid, a substance widely used on a small scale, but hitherto not considered available for sewage treatment on a large scale. The operations of the Board, however, have not been confined merely to the application of chemicals, but also to their production on a large scale, with the result that while manganate of soda, the actual agent in the production of permanganic acid at the commencement of the Board's operations could be obtained only in limited quantities at 40*l.* per ton, it can now be purchased in practically unlimited quantities at 11*l.* per ton.

The application of this material in conjunction with sulphuric acid has met with such success, not only in London but elsewhere, that the necessity for land filtration no longer exists; and thus the great objection to the treatment of the sewage, and the discharge of the effluent at the present outfalls, is overcome.

The deodorisation of the sewage as a temporary measure, pending the construction of permanent works for its treatment by precipitation, has been systematically carried on. At first this was accomplished by means of chloride of lime, that substance being the only one obtainable in sufficient quantities at the time. Manganate of soda and sulphuric acid were subsequently used. In order to obtain the former of these in sufficient quantity at a low price, the Board found it necessary to construct chemical works and manufacture it themselves, with the result of reducing the cost as above stated. During the past summer these chemicals were the only ones used, and were found to be thoroughly effective.

For the purpose of preventing any nuisance within the metropolis arising from the discharge of offensive gases from sewer ventilators, the Board authorised the application of manganate of soda and sulphuric acid to the sewage as it flowed through the main sewers. Accordingly thirteen stations were arranged at the following places, viz.:—Bedford Park, Willesden, Pimlico, Westminster, Bayswater, Holloway, Old Ford, the Tower, Deptford, and Battersea.

The first of these came into operation on July 28th, and the remainder as rapidly as possible. These stations are now being considerably augmented, and thus, while the evolution of sewer gas will be prevented within the metropolis from sewers under the Board's authority, more complete control will also be obtained over the storm overflows.

Provision has been made for the supply of 3,000 tons of manganate of soda, and 1,000 tons of sulphuric acid. Of this quantity 1,000 tons of manganate are now in stock, and the remainder is under contract for delivery by July, deliveries commencing at once. Should these quantities prove insufficient, by reason of another exceptional season, there will be no difficulty in providing as much more as may be required, either by manufacturing or purchasing it.

The plan of deodorising the sewage within the metropolis is proposed, not only as a temporary measure, but also as a permanent scheme for preventing the sewer gas nuisance, and will, therefore, ensure, during the summer months, the arrival of the sewage at the outfalls in a deodorised condition, and thus materially assist in the production of an effluent of a far better character than would otherwise be obtainable.

The contract drawings for the enlargement of the Barking reservoir, and arranging it for precipitation and purification works, are in a forward condition, and the contracts may be let in the course of the ensuing summer, and the works completed and ready to come into full operation for the summer of 1888; in the meantime, the deodorising works already described will prevent any nuisance from arising at this outfall.

Nine million gallons of sewage per day will be precipitated at Crossness throughout the coming summer, and the remainder will be deodorised, as on the north side, until the process of precipitation has been extended to the whole of the sewage discharged at this outfall.

The sludge arising from the precipitated sewage is being pressed into 'cake,' and given to agriculturists gratuitously to utilise upon their lands, and, if possible, to develop a demand for its use; and sludge that may not be so disposed of will be sent in lighters out to sea, both in the liquid and in the cake condition, in order to ascertain the cost and effect of this mode of getting rid of it.

The Board have now under consideration the twenty-three designs sent in by shipbuilders in reply to the invitation issued by the Board, and will shortly be in a position to determine what course they will adopt with respect to them.

Your committee submit the above facts for the information of the Board, and beg to recommend: That letters founded upon this report be addressed to the Secretary of State and the Erith Local Board of Health, in reply to their communications on the subject."

The report was received, and ordered to be printed and circulated, its consideration being postponed for a fortnight.

German Renaissance. — So much importance is often attached by the unskilled public to names as indicative of architectural or pictorial styles that the exposition lately given by Dr. Lehfeld at Berlin deserves mention as elucidating the above subject. According to his view, much is now described as *German Renaissance*, which should more properly be styled *Baroque*. While the Renaissance period in Italy extended from 1420 to about 1540, the movement only displayed itself in Germany about 1500, and was concentrated in the period between then and 1560. A distinction was drawn by the lecturer between the Renaissance works built in Germany by Italians, and those designed by native architects. The introduction of Renaissance styles into Germany was due not only to architecture, but also to painting and engraving; the pictorial treatment of many German Renaissance works being thus explained as well as the occurrence of ideas drawn from metal work, &c. In North and South Germany true Renaissance work has a like character of graceful simplicity.

ARCHITECTURAL ASSOCIATION VISITS.

THE fourth Saturday afternoon visit of this Association for the present session was made on Saturday last to the houses in Kensington-court which are being erected from the designs of Mr. Stevenson.

The houses now in course of erection are principally facing the street which runs parallel to the High-street, the roadway having been raised some 8 ft. from the original level; the angle house, which is very ingeniously planned, with a small frontage to each street, has the dining-room on the floor below the entrance-hall, which is, however, still well above the level of the street at the back; this lower ground-floor comprises in addition the kitchen and offices. The hall floor comprises, in addition to the large hall, two reception-rooms. There are two floors above this. The other houses are arranged with large halls in the centre of the block. The external elevations are faced with red brick; some with buff terra-cotta dressings, others with gauged brick. All the houses have lifts, which pass through the principal floors, and which are worked by hydraulic power, which is supplied by the Hydraulic Power Company, who have a station on the estate. The lifts are made with an arrangement whereby the doors opening into the lift cannot be opened unless the cage is opposite the door. At the back of the estate the stables have been built. These are arranged with the coach-houses on the ground-floor; the stables are on the first floor, approached by an inclined plane, with a rise of 1 in 3; and above these, the coachmen's living-rooms, which have a separate gallery and staircase to reach them from the ground, and also a staircase from them to the stable level.

PROPOSED UNITED ARTS CLUB.

SIR,—Will you allow me, through the medium of your valuable columns, to draw the attention of professional men to the fact that a circular will, in the course of a few days, be issued relative to the above? The Club will be founded on principles comprising all the accessories pertaining to institutions of a similar nature, and will provide accommodation specially suitable to the requirements of professional men.

All architects, painters, sculptors, and engineers in the United Kingdom will be eligible. By thus bringing together the various members of these kindred professions, it is hoped to promote more social intercourse than at present exists between them.

The annual subscription will be placed at the lowest possible figure, so as to enable the younger members to participate in the benefits offered.

A. LOWTHER FORREST,
Hon. Sec. (*pro. tem.*)

No. 19, *York Buildings, Adelphi, W.C.*

SEWER VENTILATION.

SIR,—"Sanitary Engineer," on p. 424 in your last issue, seems to me to be as far at sea in his sewerage sanitation as he is in his grammar. He says:—"Thorough aëration . . . . and a perfect system of flushing *has* prevented the generation of the gas altogether." Now, I do not believe him. These will diminish the production of the gas and dilute it, but not prevent it altogether. Moreover, it is not only the "gas" that has to be guarded against, but disease germs floating in the "gas" or in the atmosphere of the sewer; hence the objections made by many people to surface-gratings in the streets as blow-offs, and especially in close and crowded thoroughfares. The *Lancet* in advocating high-level outlet ventilating pipes for sewer ventilation is simply recommending a sensible plan, and one which would be of great benefit in many places where the street-gratings are dangerous. I have suggested this often for years back.

W. P. BUCHAN.

*** Where are the pipes to go, so as not to be either an eyesore and obstruction, or a concentrated danger to individual houses? That is the question,—or one of the questions,—in connexion with the subject.

Buxton.—At a recent meeting of the Directors of the Buxton Improvement Commissioners, it was decided to recommend that the capital of the company be increased by 4,000*l.* for the purpose of erecting an assembly-room adapted to the requirements of a theatre. It was also decided to accept an offer from the Duke of Devonshire of part of the Serpentine to be added to the Pavilion Gardens as a recreation-ground for juveniles, &c.

The Student's Column.

OUR BUILDING STONES.—II.

THE GENERAL CHARACTERS OF ROCKS.

THE word "rock" does not necessarily imply that the substance is of a solid, rocky material, although rocks used for building purposes are generally so. Geologists apply the word to gravel, clay, sand, and mud equally as to granite, sandstone, and limestone. All rocks are mixtures of different minerals in varying proportions, and they are not therefore definite chemical compounds. In describing a rock it is not enough to mention its component minerals, for distinct varieties of rocks may be made up of similar minerals. For instance, suppose we state that it is made almost wholly of calcite; this would equally apply to statuary marble, chalk, and encrinital limestone, and yet these rocks are widely different from each other in other matters. In addition to mentioning the minerals that compose the rock, it is necessary to state its texture, state of aggregation, and general structure. A rock may be *crystalline*,—a compound chiefly or altogether of crystals or crystalline particles,—or *fragmental*,—composed of detritus, &c.

When a rock has a finely crystalline groundmass (matrix) through which distinct larger crystals are dispersed, it is called a *porphyry*. When we speak, therefore, of porphyries, which are largely used in some districts for ornamental purposes, it must be remembered that the term refers only to this peculiarity of the structure of the stone. Granite is composed principally of quartz, felspar, and mica, but if the felspar crystals were large, and showed up prominently in the mass, it would no longer be called granite, but porphyry, or porphyritic granite.

Marble, strictly speaking, is crystalline limestone, but for architectural purposes we shall include under this name various rocks that may not be limestones or even crystalline, and, indeed, it is usual to include any stone that is hard enough to be capable of receiving a polish, some granites and the like excepted.

Freestone is not a geological term. It is used in connexion with sandstone and limestone, and denotes that the rock can be cut into blocks in any direction, without a marked tendency to split in any one place more than in another.

Some exceedingly compact limestones break with a peculiar fracture into convex and concave rounded shell-like surfaces. This fracture is called *conchoidal*. Finely granular rocks which are very compact, sometimes break with a *splintery* fracture. They are often very difficult to manipulate.

When we say that a rock is *calcareous*, it denotes that it contains much carbonate of lime; *siliceous*, containing much silica; *felspathic*, having felspar as a principal constituent; *arenaceous*, sandy; and *argillaceous*, clayey.

THE CHEMICAL ACTION OF RAIN AND AIR ON STONE.

Having given a few of the more important features which characterise rocks generally, we will now proceed to discuss the action of rain and air on them in so far as it concerns the decay or preservation, as the case may be, of those used for building purposes.

The normal condition of the atmosphere is considered to be a mechanical mixture of nearly four volumes of nitrogen and one of oxygen with very small proportions of water vapour and carbonic acid, and still smaller quantities of ozone and ammonia. In addition to these, other vapours, gases, and solid particles are often present. It is with the vapour which, when condensed, forms rain, hail, and snow, that we have now particularly to deal. In falling, rain takes up a very small portion of air, including the contained gases, and the impurity of the atmosphere at any place is best examined by analysing the rain-water of the district.

An average proportional percentage composition of rain-water by measure is,—nitrogen, 64·47; oxygen, 33·76; carbonic acid, 1·77. Carbonic acid being more soluble than the other gases is contained in rain-water in proportions between thirty and forty times greater than in the atmosphere. Oxygen, also, is more soluble than nitrogen. This difference acquires a considerable importance in the chemical operations of rain.*

An analysis of rain-water will show us that *sulphuric acid* frequently occurs in the air of our large cities in considerable quantities, but more especially so in the manufacturing districts, where its presence is governed more or less by the nature and magnitude of the manufactories.

The same thing applies to a certain extent to *hydrochloric acid*. We should find that this acid occurred largely in a free state in towns; but it exists in the sea-air as chlorides, principally as chloride of sodium,—common salt. The amount in sea-air would be proportionate to the saltness of the sea, and the rapidity of evaporation.

Nitric Acid also occurs in small quantities in rain-water.

We have seen that rain-water in descending through the air takes up a certain quantity of it, and that *carbonic acid* is largely present in rain-water. Any stone containing carbonate of lime is attacked by this acid. Carbonate of lime is insoluble in water, but the carbonic acid converts the lime into a bi-carbonate, which is soluble, and is thus removed from the stone. If this carbonate does not play a conspicuous part in the composition of the stone, then the stone is not much injured by the acid, but such stones that are largely made up of it, are liable to decay quickly. We say *liable*, advisedly, because it is not a rule, as many stones used in building will be seen to contain a comparatively high percentage of it, and yet are fairly durable. It depends in a great measure on the form which the carbonate of lime takes,—whether it be crystalline or not,—and which has, therefore, to do with the structure and not the chemical composition of the stone. We shall further allude to this.

* Geikie, "Text Book of Geol." (1882), p. 330.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

7,674, Sharpening and Setting Saws. L. Martinier.

The saw is supported by a holder which can be raised or lowered, and is sharpened by a file fixed in a holder, to which a reciprocating motion is imparted by a crank and connecting-rod. The holder and the mechanism for advancing the saw tooth by tooth and engaging and disengaging the sharpening mechanism, are described in a previous specification. The saw is set by the successive action of deflecting jaws and a pair of larger jaws which press back any teeth which are bent too far. Special mechanism is used for engaging and disengaging the setting mechanism when the saw is advanced.

9,762, Cattle Drinking-Troughs. R. Pringle.

The orifice of the inlet-pipe from the main is directed upwards and protected by a shield presenting its convexity to the inflow to direct the water upwards, thus obtaining a surface flow of water and a "tranquil bed." At the other end of the trough is an overflow funnel-shaped waste-pipe head, leading into a waste-pipe. The bottom of the trough is concave towards the centre or other point, at which is connected a cleaning-out pipe and mud-cock.

9,846, Excavator. J. F. Sang.

Two or more rotary disc cutters and a plough are mounted in the fore part of the main framing, and serve to cut and direct the earth into a receptacle through which the endless series of the elevator buckets work. The elevator is driven from the axle of the rear supporting roller, either directly or through a second motion-shaft, by means of the pitch-chain and pulleys. The depth of cut can be regulated by the front guiding-wheel or roller, which can be adjusted in the bearing or support of the main framing.

12,136, Cellars, &c. P. Schaar.

The vessels containing the beer, &c., are formed of masonry, glass, earthenware, concrete, or a similar material, and may be lined, if required, with cement and the like. They are fixed permanently in rows, with their front walls facing a passage, and are so arranged that they may be nearly surrounded with ice. These front walls are provided with manholes, and the bungs consist of screw-caps, with plugs having a bore communicating with a pipe leading to a gas-vent or discharge-valve in the front wall.

13,350, Kilns and Stoves. J. C. Webb.

The kilns are placed one above another, and the flues arranged so that the gases pass round the top and sides before passing beneath the floor. In a modified form a single flue from each fireplace passes round both the kilns, with an intermediate connexion to the stack, so that the heat may be confined to the lower kiln if necessary.

13,651, Portable Load Gauge. H. Adair.

The apparatus is used for gauging the height and width of loads. It consists of a folding post of adjustable length, with a hinged gauge arm and a hinged foot, and is placed beside the wagon or conveyance.

14,892, Fireplace. Winfield, Evered, and Underhill.

A mantel register stove is converted into a cooking stove by the addition of an oven and boiler. The oven is fitted to the fire, and is surrounded by a flue through which the products of combustion pass to the chimney, a perforated damper regulating the draught. A supplementary gas-burner is provided, and is protected from the fire by a plate which has space at the sides to allow the smoke from the fire to pass iuto the flue. A boiler, provided with a separate flue and damper, may be placed behind the fireplace. The oven is ventilated by opening the damper.

NEW APPLICATIONS FOR PATENTS.

March 5.—3,109, J. and O. Cunningham, Jointing Pipes.—3,113, C. Henderson, Ventilation.—3,115, G. Kyte, Self-locking Coal Plate. — 3,123, H. Rothery, Locks and Latches.—3,139, F. Hammond, Hinge.

March 6.—3,161, W. Meakin, Drain-pipes, &c.—3,164, B. Sutcliffe, Planing and Moulding Cutters for Wood.—3,208, H. Parenty, Syphon Apparatus for Flushing.

March 8.—3,214, A. Browning, Gas and Water Meter.—3,252, A. Henderson, Stained-glass Window. — 3,259, H. Penrice, Rock - tunnelling Machinery.

March 9.—3,272, C. Wharton, Continuous Motion Handle for Screw-drivers. — 3,274, F. Hamilton, Nail Screws.—3,283, S. Mower and T. Fowler, Machines for Making Saws.—3,285, W. Howie and R. Henderson, Windows.—3,336, H. Kingsbury and A. Puzey, Window Fastener.

March 10.—3,352, H. Lander, Silos.—3,354, C. Price, Levers for Sash Fasteners.—3,375, W. Lund, Brace Bits, Bradawls, Gimlets, &c. — 3,388, H. Dempewulf, Smoke-consuming Fire-places.—3,391, S. Payne, Firebricks, Retorts, &c.

March 11.—3,416, W. Barraclough, Cast-metal Door and Frame.—3,420 and 3,421, G. Jarvis, Bastic Bricks.—3,424, M. Macleod, Laying Wood, Tile, Concrete, and other Pavements.—3,449, C. Davis, Roofing Tiles.—3,452, J. and F. Loughran, Window Sashes and Frames.—3,459, J. Plenty, Glazed Structures and Skylights.—3,478, W. Punchard, Construction of Harbour, Dock, and Quay Walls, Breakwaters, Piers, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

15,613, T. Gray, Door Locks.—801, A. Pilling, Self-closing Doors.—930, W. Bartholomew, Water Waste-preventing Cisterns.—1,408, W. Webb, Ventilating.—1,416, J. Fletcher, Fasteners for Doors, Gates, &c.—1,491, R. Jenkins and J. Cox, Enamelled Coloured Plaster for Walls, &c.—1,572, S. Gratrix, Gasfittings.—1,650, E. Cameron, Nail.—1,654, A. Gold, Hinges.—1,691, T. Helliwell, Zinc or other Metal Roofing.—1,706, J. & A. Cooke, Syphon Cisterns for Flushing Water-closets, &c.—2,120, B. Boothroyd, Automatic Ventilation.—2,269, W. Payton, Preventing Water-pipes being Burst by Frost.—6,112, H. Chancellor, Automatic Window Holder or Fastener.—1,936, W. Scarlett, Pipe Tongs and Cutters.—1,996, W. Haigh, Mitreing Machine.—2,063, H. Morris, Window Fastening.—2,131, R. Greenwood and J. Webb, Sash Fasteners.—2,150, B. Twigg, Chandeliers.—2,149, S. Bridgen, Gas Bracket and Chandelier Fittings.—2,286, A. Schauschieff, Locks and Latches.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

6,928, A. Ashwell and C. Cross, Indicating Door Fastenings.—7,055, H. Johnson, Warming and Ventilating.—7,289, H. Fourness, Gas Lighting Apparatus.—1,604, E. Ashby and A. Ashby, Cement Kilns.—4,975, C. and F. Smith, Attaching Door Knobs to Spindles.—6,225, E. Bellow, Latches for Doors, Gates, &c.—6,694, H. Doulton, Moulding Earthenware Pipes with a Socket at their end.—6,842, C. Grimmet and J. Cook, Window Fasteners.—8,485, A. Emery, Eye Links or Bars, &c., for Bridges, Buildings, &c.—6,521, T. Street, Lock Bricks.—6,439, J. Ellis, Metal Rib for Bridge Floorings for Columns, &c.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MARCH 8.

By G. COOTE & SON.

Westminster—One-third Share of 1, Great George street, freehold £3,250

MARCH 9.

By WESTON & SONS.

Brixton—50, Wiltshire-road, 75 years, ground-rent 9*l.* 450

84 to 90, Loughborough-road, 18 years, ground-rent 16*l.* 985

By T. B. WESTACOTT.

King's-cross—34, Hastings-street, 21 years, ground-rent 8*l.* 8s. 295

By F. W. GLASIER.

Chelsea—406, King's-road, 24 years, ground-rent 9*l.* 16s. 485

By DYER, SON, & HILTON.

Blackheath—The Lease of 117, Lea-road, term 7 years 70

MARCH 10.

By FULLER, HORSEY, SONS, & CASSELL.

Spitalfields—Freehold Ground-rent of 40*l.* per annum, reversion in 81 years 800

By H. MILLS & TITCHMARSH.

Strand—9 and 10, Stanhope-street, 84 years, ground-rent 150*l.* £2,000
Peckham, York-grove—Lime Cottage, 28 years, ground-rent 8*l.* 240

MARCH 11.

By WOOD & SPINK.

Holborn—4, East-street, the Lease of, term 22 years 280

By A. BOOTH.

Kennington—67 and 69, New-street, 9 years, ground-rent 9*l.* 185

By HENDERSON & PEWTRESS.

Sydenham, Wells-road—Poplar Cottage, freehold... 380
Blackheath—2, Eastcombe Villas, 71 years, ground-rent 10*l.* 10s. 800

By HARDS & JENKINSON.

Muswell Hill—Ground-rent of 54*l.* 12s., reversion in 98 years, and a Plot of Land 2,650

By NEWBON & HARDING.

Holloway—103 and 105, Moray-road, 78 years, ground-rent 12*l.* 12s. 480
107 and 117, Moray-road, 78 years, ground-rent 12*l.* 12s. 490
37 and 38, Charteris-road, 78 years, ground-rent 12*l.* 12s. 450
Highbury, St. Paul's-road—Two Plots of Freehold Land 720
23, 25, and 27, Hamilton-road, 61 years, ground-rent 13*l.* 16s. 825
Islington—42, 44, and 46, Prebend-road, 40 years, ground-rent 12*l.* 12s. 880
34, Hardinge-street, 45 years, ground-rent 6*l.* 290

By C. C. & T. MOORE.

Stratford—110, 112, and 114, The Grove, Freehold. 6,030
227, Leytonstone-road, 60 years, ground-rent 7*l.* 10s. 550
Lambeth—14 to 17, James-street, Freehold 1,290

MARCH 12.

By NORTON, TRIST, WATNEY, & Co.

Whitechapel—19 and 20, Vine-court, Freehold 710
8, 9, and 10, Vine-court, Freehold 1,075

By BAKER & SONS.

South Kensington—Profit Rental of 92*l.* a year, term 20 years 830
Pinner—Three Plots of Freehold Land, 4a. 2r. 34p. 1,320
Four Plots of Freehold Land, 5a. 2r. 22p. 1,865

MEETINGS.

SATURDAY, MARCH 20.

St. Paul's Ecclesiological Society.—Visit to the Charterhouse. 3·15 p.m.

Edinburgh Architectural Association.—Visit to the Buildings of the International Exhibition of Industry. 2·30 p.m.

MONDAY, MARCH 22.

Surveyors' Institution.—Mr. Wm. Mathews on "The Taxation of Real Property." 8 p.m.

Society of Arts (Cantor Lectures).—Mr. Boverton Redwood on "Petroleum and its Products." III. 8 p.m.

Inventors' Institute.—8 p.m.

Leeds and Yorkshire Architectural Society.—Members' *Soirée.*

TUESDAY, MARCH 23.

Builders' Clerks' Benevolent Institution. — Annual Dinner, Holborn Restaurant, 6 p.m.

Institution of Civil Engineers.—Discussion of the three papers by Messrs. R. Gordon, J. R. Mosse, and G. C. Cuningham, on "The Economical Construction and Operation of Railways in newly-developed Countries, or where small returns are expected." 8 p.m.

Society of Arts (Foreign and Colonial Section)—Mr. Alexander Begg on "Canada and its National Highway." 8 p.m.

WEDNESDAY, MARCH 24.

Society of Arts.—Mr. W. H. Preece, F.R.S., on "Domestic Electric Lighting." 8 p.m.

Carpenters' Hall, London Wall.—Mr. H. H. Statham on "The Fine Art Aspect of Woodwork." 8 p.m.

Civil and Mechanical Engineers' Society.—Mr. F. G. M. Stoney "On the Construction of large Sluices for Irrigation, Drainage, and Navigation." 7 p.m.

Surrey Archæological Society.—Annual Meeting at Whitgift Hospital, Croydon. Papers by Dr. Alfred Carpenter, Mr. J. R. Trewer, and Mr. S. W. Kershaw, on "Whitgift's Hospital." 7 p.m.

THURSDAY, MARCH 25.

Society of Antiquaries.—8·30 p.m.

Society of Telegraph-Engineers and Electricians.—Mr. Alexander Bernstein on "Electric Lighting by means of Low Resistance Glow Lamps." 8 p.m.

FRIDAY, MARCH 26.

Architectural Association.—Members' *Soirée.* 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. Wm. Andrew Legg on "The Construction of the Hirnant Tunnel on the line of Aqueduct of the Vyrnwy Waterworks for the Supply of Liverpool." 7·30 p.m.

SATURDAY, MARCH 27.

Architectural Association.—Visit to the Royal Courts of Justice. Members to assemble in the Great Hall at 3 p.m.

Edinburgh Architectural Association.—Visit to Niddrie Marischall.

Miscellanea.

Surrey Archæological Society. — The annual general meeting of this society, to receive the report of the Council, to elect officers for the ensuing year, and for general business, will be held at the Whitgift Hospital, High-street, Croydon, on Wednesday next, the 24th inst., after which Dr. Alfred Carpenter and Mr. J. R. Trewer will offer some remarks on the history and nature of the foundation of the Whitgift Hospital. Mr. S. W. Kershaw, M.A., F.S.A., will also read a paper entitled "Notes and Annals of the Hospital;" and Mr. Henry Berney, A.R.I.B.A., will describe the paintings in the Chapel of the Hospital.

The New Unitarian Hall in Essex-street. In the *Builder* of the 27th ult. appeared an article on the historical associations connected with Essex-street Chapel, Strand, which is now being converted into a public hall for the general uses of the Unitarian body. The structural alterations include, externally, the Essex-street frontage, which has been designed in the Italian style, faced with cement. Arched windows have been opened out, and the frontage has been relieved with handsome pilasters and cornices. The entrance to the office portion of the re-arranged structure is at the north angle, and is in Portland stone, with ornamental iron gates. Internally, the area of the chapel,—which was on the first floor,—is being converted into a public hall, 50 ft. by 40 ft., with a large recess for an organ, and over the east end there will be a gallery capable of accommodating 200 persons, the entire capacity of the hall being equal to an audience of 600. Besides the hall there are several retiring-rooms. The hall is approached from the ground-floor by a handsome stone staircase. On the ground-floor what was the old house as the residence of the ministers, together with several other apartments, have been converted into offices for the various Unitarian book societies. A shop for the sale of books has been provided, whilst adjacent are large apartments for storage purposes. On this floor there are also several committee-rooms, together with a library, likewise a council-chamber, lighted by a skylight, and fitted with pitch-pine dado and fittings. As already stated, Messrs. T. Chatfeild Clarke & Son are the architects, and Mr. J. T. Chappell, of Pimlico, is the contractor. The cost of reconstructing the building will be about 6,000*l.*

The First Theatre in Brighton.—"The History of the Theatres of Brighton," with brief biographical notes of the principal performers from 1774 to 1885, written and collated by Henry C. Porter, twenty-four years dramatic critic at Brighton, will be issued shortly. The author says:—"The first theatre that Brighton could boast of was in North-street, and approached through a garden that abutted upon the main thoroughfare from Church Hill to the Steine. The building was of wood, with brick basement, and underneath the house was a vault dug out of the chalk bank, in which it is said smuggled spirits used to be kept, as opposite the building were uncultivated fields and narrow bridle paths that merged into the greater Laine at the rear. The entry to the theatre was partly concealed by a high wooden hoarding, and there was also another entrance from the back in Duke-street. The house was sustained by massive oak beams, and the stage was with its back to the west, rather declining towards the row of oil lamps and the circle of lamps that served to illuminate the shrine of Thespia. The structure was erected in the spring of 1774 by Samuel Paine, a bricklayer, who resided in a cottage close at hand, and followed that vocation. The first tenant was Roger Johnstone, a property-man from Covent Garden, who inaugurated the initial season on Tuesday, August 30, 1774, with Garrick's farce 'Lethe, or Æsop in the Shades,' preceded by Colman's 'Jealous Wife.'"

The Unemployed. — The *employés* at the different Government Works in London, being invited by the heads of the firm of Messrs. Perry & Co., Government Contractors, to assist in forming a fund for the relief of the distressed workmen, responded by at once forming a committee of the several foremen, or their representative, of each district, and raising weekly subscriptions from the men under their charge (for a period of six weeks, if necessary), the mechanics subscribing one shilling and labourers sixpence each week. This has been so heartily taken up by the workmen that the committee were able, at their last meeting, to consider and give relief to twenty-five applicants, these being in all cases workmen who have been engaged upon Government works from time to time and well known to the foreman, who is responsible to the committee and vouches for their being duly entitled to such relief. The firm sent the treasurer a handsome donation of 10*l.*, which enabled the committee to grant to each of the twenty-five applicants the sum of 1*l.* each.

The Tite Prize.—Mr. Leeson writes to point out that his design "Spes" was placed third, not second, in the Institute list, the second being "Doric." The place of the two was inadvertently transposed in our remarks on the drawings.

Lightning Conductors in Germany.—The Lübeck Insurance Association has been taking steps to facilitate the adoption by its policy-holders of these important preservatives against disaster, by reducing its rates for insuring buildings thus protected and arranging easy terms of payment with a Berlin firm which supplies them. The importance of this question to the office referred to may be estimated from the fact that scarcely one-twelfth of the cases of damage from lightning occur in towns or villages, and the rural nature of the district in which its risks lie renders it peculiarly liable to losses from this cause. It is stated that buildings with soft roofing are struck two and a half times oftener than those with hard roofing, and are twenty times more liable to become ignited than the latter.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	6 0 0	7 0 0
Teak, E.I. ....load	12 10 0	15 0 0
Sequoia, U.S. ....foot cube	0 2 4	0 3 0
Ash, Canada ....load	3 0 0	4 10 0
Birch ,, ...load	3 0 0	4 10 0
Elm ,, ...load	3 10 0	4 15 0
Fir, Dantsic, &c. ....load	1 10 0	4 10 0
Oak ,, ...load	3 0 0	5 0 0
Canada ....load	5 10 0	6 10 0
Pine, Canada red ....load	3 0 0	4 0 0
,, yellow ....load	3 0 0	5 0 0
Lath, Dantsic ....fathom	3 10 0	5 0 0
St. Petersburg ....load	4 0 0	6 0 0
Wainscot, Riga....log	2 15 0	4 10 0
,, Odessa, crown ....load	3 12 6	3 15 0
Deals, Finland, 2nd and 1st...std. 100	7 10 0	8 10 0
,, 4th and 3rd ....load	6 0 0	7 10 0
Riga ....load	6 0 0	8 0 0
St. Petersburg, 1st yellow ....load	9 0 0	14 0 0
,, 2nd ,, ...load	7 0 0	8 15 0
,, white ....load	7 0 0	10 0 0
Swedish....load	6 0 0	15 0 0
White Sea ....load	7 0 0	17 10 0
Canada, Pine 1st ....load	17 0 0	30 0 0
,, 2nd ....load	12 0 0	17 0 0
,, 3rd, &c. ....load	6 0 0	10 0 0
,, Spruce 1st ....load	8 0 0	11 0 0
,, 3rd and 2nd ....load	5 0 0	7 10 0
New Brunswick, &c....load	5 0 0	7 0 0
Battens, all kinds ....load	4 0 0	12 0 0
Flooring Boards, sq. 1 in.—Prepared, first ....sq.	0 9 0	0 13 0
Second ....sq.	0 7 6	0 8 6
Other qualities ....sq.	0 5 0	0 7 0
Cedar, Cuba....foot	0 0 3½	0 0 4
Honduras, &c. ....foot	0 0 3	0 0 4
Australian ....foot	0 0 2½	0 0 3
Mahogany, Cuba ....foot	0 0 5	0 0 7½
St. Domingo, cargo average ....foot	0 0 5	0 0 7½
Mexican ,, ...foot	0 0 3½	0 0 4½
Tobasco ,, ...foot	0 0 4	0 0 6½
Honduras ,, ...foot	0 0 4½	0 0 6½
Maple, Bird's-eye....foot	0 0 6	0 0 8
Rose, Rio ....ton	7 0 0	10 0 0
Bahia....ton	6 0 0	10 0 0
Box, Turkey ....ton	5 0 0	18 0 0
Satin, St. Domingo ....foot	0 0 7	0 1 0
Porto Rico ....foot	0 0 8	0 1 3
Walnut, Italian ....foot	0 0 4	0 0 5

METALS.		
IRON—Pig in Scotland ....ton	1 19 7	0 0 0
Bar, Welsh, in London....ton	4 15 0	5 0 0
,, ,, in Wales ....ton	4 7 6	4 10 0
,, Staffordshire, London ....ton	5 15 0	7 0 0
Sheets, single, in London....ton	7 10 0	9 0 0
Hoops ,, ...ton	6 5 0	7 5 0
Nail-rods ,, ...ton	5 15 0	7 0 0
COPPER—		
British, cake and ingot ....ton	44 10 0	45 15 0
Best selected ....ton	46 10 0	47 10 0
Sheets, strong....ton	53 0 0	0 0 0
,, India ....ton	0 0 0	0 0 0
Australian ....ton	47 0 0	0 0 0
Chili, bars ....ton	42 10 0	42 17 6
YELLOW METAL....lb.	0 0 4½	0 0 4½
LEAD—Pig, Spanish ....ton	13 2 6	0 0 0
English, common brands....ton	13 15 0	0 0 0
Sheet, English ....ton	14 7 6	14 10 0
SPELTER—		
Silesian, special ....ton	14 15 0	15 0 0
Ordinary brands ....ton	14 10 0	14 15 0
TIN—		
Banca ....ton	0 0 0	0 0 0
Billiton ....ton	0 0 0	0 0 0
Straits ....ton	93 5 0	94 0 0
Australian ....ton	93 7 6	94 0 0
English ingots....cwt.	97 0 0	0 0 0
ZINC—		
English sheet ....ton	17 0 0	17 15 0

OILS.		
Linseed ....ton	20 10 0	20 17 6
Cocoanut, Cochin ....ton	29 0 0	29 10 0
Ceylon ....ton	26 0 0	0 0 0
Copra....ton	0 0 0	0 0 0
Palm, Lagos ....ton	35 0 0	0 0 0
Palm-nut Kernel ....ton	23 10 0	0 0 0
Rapeseed, English pale....ton	23 5 0	23 10 0
,, brown ....ton	21 15 0	0 0 0
Cottonseed, refined ....ton	17 0 0	18 10 0
Tallow and Oleine ....ton	25 0 0	40 0 0
Lubricating, U.S. ....gal.	6 0 0	10 0 0
,, Refined ....gal.	8 0 0	13 0 0
TURPENTINE—		
American, in casks....cwt.	1 9 6	1 10 3
TAR—Stockholm ....barrel	0 19 0	0 19 6
Archangel....barrel	0 12 0	0 13 6

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Removal of Dust	Vestry of St. Giles, Camberwell	*Official*	March 23rd	xviii.
Navy Contracts	Admiralty	do.	March 23 to 30	ii.
Erection of Sanatorium	Kent County Asylum	F. W. Ruck	March 26th	xviii.
Asphalte Footway Pavements	Com. of Sewers	*Official*	do.	ii.
Wood Pavement	do.	do.	do.	ii.
Building Materials and Tools	Com. of Prisons	do.	March 27th	xviii.
Erection of Four Houses		Morris & Thompson	do.	xviii.
Guernsey Granite	Croydon Union	*Official*	March 29th	xxviii
Wood Pavement	Folkestone Cor.	A. W. Conquest	do.	xxviii
Carriage Timber	Great Western Ry. Co.	*Official*	do.	xviii.
Sewerage Works	Colne and Marsden L. B.	H. Bancroft	do.	xviii.
Tower Bridge.—Contract No. 1	Bridge House Est. Com.	J. W. Barry	do.	ii.
Additions to Girton College, Cambridge		A. Waterhouse	March 30th	xviii.
Enlargement of Post-Office	Com. of H.M. Works	*Official*	March 31st	ii.
Heating and Ventilating, Fittings, &c.	Longton Town Council	J. W. Wardle	April 1st	xviii.
Brick and Pipe Sewers, and Paving	Toxteth Park Local Bd.	J. Price	do.	xviii.
Arthur-street East Extension	Com. of Sewers	*Official*	April 2nd	ii.
Works, Repairs, and Materials	War Department	do.	do.	ii.
Adapting Premises for Police purposes	Metro. Police Dist.	do.	April 3rd	xviii.
Fire Villa Residences, Sutton		A. R. Stenning	April 5th	xxviii
Sewers, Paving, Kerbing, &c.	Beckenham Local Board	G. B. Carlton	do.	xviii.
Works and Materials	Finchley Local Board	G. W. Brumell	do.	xviii.
Metalling, Kerbing, Tar Paving, &c.	Barking Town Locl Bd.	C. J. Dawson	April 7th	xxviii
Stone Bridge, &c.	Sheffield Corporation	R. Davidson	April 8th	xviii.
Officer's House, Four Cottages, &c., Thorpe	Admiralty	*Official*	April 9th	ii.
Furniture and Fittings	Birkenhead Corporation	C. O. Ellison & Son	April 10th	xviii.
Broken Granite, Flints, &c.	Wimbledon Local Brd.	*Official*	April 13th	xxviii
New Bridge, Battersea	Met. Board of Works	do.	April 16th	ii.
Sewerage Works	Hereford Town Council	J. Parker	April 19th	xviii.
Works, Repairs, and Materials	War Department	*Official*	Not stated	ii.
Erection of Church, Longridge		Longworth & Gardner	do.	xxviii
Waterworks	W. Glo'stershre Wtrwks	*Official*	do.	xxviii
Works and Materials	War Department	do.	do.	ii.
Hall and Buildings, Newbury, Berks	Oddfellows	do.	do.	xxviii
Erection of Houses, Finchley and Peckeam		J. B. Wotton	do.	xxviii

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Deputy Executive Engineer	Bombay Municipality	800 Rupees Monthly	March 23rd	xvi.
Assistant Surveyors	Civil Service Com.	Not stated	March 29th	xvi.
Surveyor and Valuer	Hendon Union	do.	April 6th	xvi.

TENDERS.

BATTERSEA.—For Dispensary and Relief Station in the Latchmere-road, for the Guardians of the Poor of the Wandsworth and Clapham Union. Mr. Thomas W. Aldwinckle, architect, East India-avenue, Leadenhall-street, E.C. Quantities by Messrs. Young & Brown:—

John T. Chappell	£3,960 0 0
George Stephenson	3,954 0 0
Holloway Bros.	3,877 0 0
W. J. Hack	3,784 0 0
A. & E. Braid	3,775 0 0
A. G. Allard	3,748 0 0
G. Howard	3,732 0 0
A. M. Deacon & Co.	3,698 0 0
F. Higgs	3,680 0 0
Thomas Gregory & Co.	3,679 0 0
F. R. Turtle	3,619 0 0
James Holloway	3,600 0 0
Turtle & Appleton	3,595 0 0
W. Hammond	3,565 0 0
Kirk & Randall	3,536 0 0
J. O. Richardson	3,486 0 0
W. Johnson	3,400 0 0
John Newton	3,295 0 0
Thomas Grant	3,273 0 0
Harris & Wardrop	3,273 0 0
Wyatt & Co. (accepted)	3,259 0 0

BRIGHTON.—For widening the King's-road, from opposite the Grand Hotel to near the entrance of the Royal Aquarium. Mr. P. C. Lockwood, Borough Surveyor. Quantities by Mr. Nunn:—

Stanbridge, Broadwater	£27,612 0 0
Anscombe, Brighton	26,100 0 0
Peters, Horsham	24,150 0 0
Mowlem & Co., London	23,264 0 0
Harrison, Brighton	22,500 0 0
Marshall, Brighton	21,000 0 0
Kirk & Randall, Woolwich	20,911 0 0
Hayter, Landport	20,824 0 0
Chappell, Pimlico	20,818 0 0
Hudson, Kearley, & Co., Brighton	19,800 0 0
Dickinson, Loughborough Junction	19,714 0 0
Reynolds & Son, Brighton	19,647 0 0
Cheesman & Co., Brighton	18,880 0 0
Deacon & Co., Norwood	17,900 0 0
Longley, Crawley	17,784 0 0

BROMLEY (Kent).—For works of street improvement, for the Bromley Local Board. Mr. Hugh S. Cregeen, surveyor:—

Limestone Tar Pavement.	Per yd. super.
G. A. Green & Co.	2s. 9d.
W. E. Constable	2 8½
A. C. W. Hobman & Co. (accepted)	2 6
John Mowlem & Co.	2 6
W. H. Bensted & Son	2 4½
Kent and Sussex Tar Paving Company	2 3½
Farthing, Lorrimer, & Co.	2 3
J. G. B. Marshall	2 2

BROMPTON.—For pulling down and rebuilding 171, 173, and 175, Fulham-road, and building seven residences in the rear, for Mrs. Dancocks. Mr. W. Nicol, architect, Church-road. Quantities supplied:—

Thorn	£6,145 0 0
C. Wall	5,945 0 0
C. Cox	5,700 0 0
W. Oldrey	5,490 0 0
Gregory	5,420 0 0
Grover & Son	5,256 0 0
Killby & Gayford	5,220 0 0
S. J. Jerrard (accepted)	5,204 0 0

CHADWELL HEATH (Essex).—For pair of semi-detached villas at Chadwell Heath, Essex, for Mr. Payse. Mr. N. P. Taylor, architect, Stratford:—

Northwood, Leytonstone	£1,825 0 0
Buckle, Stratford	1,760 0 0
Barnes, Ilford	1,730 0 0
Death, Chadwell Heath	1,695 0 0
Gregar, Stratford	1,647 0 0
Arber, Leytonstone	1,633 0 0
Searles, Leytonstone	1,520 0 0
Baxter, Stratford (withdrawn)	1,397 0 0

COLCHESTER.—For a pair of cottages. Mr. T. Clarke, Colchester. Mr. J. F. Goodey, architect:—

G. Bowles	£382 0 0
G. Lee	355 0 0
H. Ambrose	350 0 0
C. Shepherd	350 0 0
A. Chambers	339 0 0
C. H. Aldridge	332 0 0
E. Eade	299 0 0
G. Dobson	295 0 0

[All of Colchester.]

COLCHESTER.—For the erection of a warehouse, &c., for Messrs. Francis & Co. Mr. J. F. Goodey, architect:—

G. Dobson	£588 0 0
Everett & Sons	550 0 0
G. Lee	545 0 0
E. Eade	500 0 0
A. Chambers	500 0 0
C. H. Aldridge	497 0 0
A. Diss	495 0 0

[All of Colchester.]

EPPING.—For new roads and sewers on the Kendal Lodge Estate, Epping, for Mr. F. D. Dixon-Hartland, M.P. Mr. Fred. C. Kettle, surveyor. Quantities by Mr. S. B. Wilson:—

	No. 1.	No. 2.	Total.
Keeble	£1,549 0 0	1,789 0 0	3,338 0 0
French	1,435 13 5	1,686 10 6	3,122 3 11
Felton	1,239 0 0	1,621 0 0	2,860 0 0
Dunmore	1,324 0 0	1,584 0 0	2,805 0 0
Pizzey	1,193 0 0	1,410 0 0	2,603 0 0
Ossenton	1,174 0 0	1,318 0 0	2,492 0 0
Adams*	998 0 0	1,099 0 0	2,097 0 0

* Accepted.

HAMMERSMITH.—For new depôt for Messrs. Carter, Paterson, & Co., under the superintendence of Mr. Wm. Eve:—

Holland	£4,173 0 0
Adamson & Sons	4,693 0 0
Mowlem & Co.	4,053 0 0
Perry & Co.	4,019 0 0
Brass & Son	3,980 0 0
Exton	3,962 0 0
Downs	3,930 0 0
Higgs	3,869 0 0
Morter	3,680 0 0
Harris & Wardrop, Limehouse*	3,643 0 0

* Accepted.

HEREFORD.—For alterations and shops, for Mr. A. G. E. Boulton. Mr. W. W. Robinson, architect, Hereford:—

W. Bowers & Co	£595 0 0
Beavan & Hodges	545 0 0
T. Lewis, Hereford (accepted)	530 0 0

ISLINGTON.—For additions and alterations to the Workhouse School, Hornsey-road, for the Guardians of the Poor of St. Mary, Islington. Mr. W. Smith, architect:—

J. Langham, Eden-grove	£1,144 0 0
J. Hirst, Finchley	1,080 0 0
A. & E. Braid, Chelsea	987 0 0
W. Hewett, Sussex-road	971 0 0
E. Green, Union-square	945 0 0
J. Webb, Stratford	925 0 0
Clarke Bros., Blackstock-road	898 0 0
Mattock Bros., Isledon-road	893 0 0
W. G. Larke & Son, City	869 0 0
J. Stainer & Son, Great Dover-street	877 0 0
Ward & Lamble, Hornsey-street	865 0 0
G. Jenvey, Camberwell	863 0 0
Hack, Poplar	800 0 0
C. Killingback, Camden-town	800 0 0
P. H. Dawes, Oxford-street	799 0 0
W. J. Davenport, Clapton	780 0 0
Norris & Luke, Grovedale-road	778 0 0
E. J. Collins, Kingsland	775 0 0
Dearing & Son, Islington (accepted)	769 0 0
J. O. Richardson, Peckham	710 0 0
W. Stiling, Clapham	699 15 0
A. Taylor, Cambridge-heath-road	685 0 0

LEYTONSTONE.—For alterations and additions to Brelinda House, Wallwood-road, Leytonstone, for Mr. J. Taylor. Mr. J. N. Horsfield, Surbiton-hill, architect:—

Judd	£366 0 0
Arbour	345 0 0
Wardle	336 0 0
Caines	335 0 0
Nicholls, Leytonstone (accepted)	320 0 0

LONDON.—For a block of buildings proposed to be erected on the east side of Queen-street, from Cheapside southwards (foundations and superstructure). Quantities supplied by Mr. F. Thomson. Mr. H. H. Bridgman, architect:—

Killby & Gayford, Worship-street	£14,843 0 0
T. Chappell, Pimlico	14,710 0 0
Wall & Co., Kentish-town	14,491 0 0
E. Lawrance & Sons, City-road	14,324 0 0
T. Boyce, Bloomsbury	13,953 0 0
W. Scrivener & Co., Regent's Park	13,944 0 0
Higgs & Hill, Lambeth	13,738 0 0
Patman & Fotheringham, Theobald's-road	13,296 0 0
J. R. Hunt, Bow-common	13,024 0 0
Perry & Co., Bow	13,077 0 0
M. Gentry, Wormwood-street	12,950 0 0
W. Shurmur, Clapton	12,926 0 0
Mowlem & Co., Westminster	12,925 0 0
J. Morter, Stratford	12,814 0 0
Ashby & Horner, Aldgate	12,745 0 0
Colls & Sons, Moorgate-street	12,700 0 0
Kirk & Randall, Woolwich	12,600 0 0
W. Brass & Sons, Old-street	12,270 0 0
M. Manley, Regent's Park	12,100 0 0
B. E. Nightingale, Albert Embankment	12,056 0 0
E. Toms, Camden-town	11,852 0 0
S. R. Lamble, Kentish-town	11,418 0 0

LONDON.—For additional stabling, &c., at The Cornwallis, Old Ford, for the London General Omnibus Company, Limited, under the superintendence of Mr. G. T. Lanham. Quantities by Mr. A. J. Bolton:—

Manley	£765 0 0
North Bros.	755 0 0
Stiling	749 15 0
Jackson & Todd	747 0 0
Haynes	700 0 0
Walker	697 0 0
Richens & Mount	680 0 0
Garrud	657 0 0
Hack	647 0 0
Hunt	599 0 0
Parker (accepted)	589 0 0

LONDON.—For sundry repairs, and for varnishing the external graining of the houses of the Licensed Victuallers' Asylum, Asylum-road, Old Kent-road, S.E. Mr. W. F. Potter, architect. Quantities prepared by Mr. C. R. Griffiths, Bank Chambers, Tooley-street:—

W. Wells, Paddington	£194 0 0
S. Hayworth & Sons, Kingsland	193 0 0
W. Wythe, Dalston	188 5 0
J. Walker, Poplar (accepted)	143 0 0

LONDON.—For additional stabling, &c., at Kilburn-lane, Kensal-green, for the London General Omnibus Company, Limited, under the superintendence of Mr. G. T. Lanham. Quantities by Mr. A. J. Bolton:—

Roberts	£1,268 0 0
Walker	1,182 0 0
Jackson & Todd	1,100 0 0
Stirling	1,099 15 0
Pain Bros	1,012 0 0
Richens & Mount	967 0 0
Manley	925 0 0
Hack	897 0 0
Garrud	875 0 0
Tomms	837 0 0
Hunt	824 0 0
Parker	823 0 0
Haynes (accepted)	800 0 0

LONDON.—For pewterer's work and counter at the Jolly Butchers Tavern, Old-street, St. Luke's, for Mr. J. W. Galton. Mr. R. A. Lewcock, architect:—

T. Heath (accepted)	£210 0 0

LONDON.—For pulling down and rebuilding No. 34, Great Titchfield-street, W., for Mr. Avory. Mr. J. Miller, architect, Margaret-street:—

Oldry	£1,387 0 0
Adams	1,295 0 0
Spencer & Co.	1,150 0 0
E. Fairchild & Co. (accepted)	1,145 0 0

LONDON.—For alterations to the Foresters' Music-hall, Cambridge-road, for Mr. J. L. Graydon. Mr. E. Clark, architect. Quantities supplied:—

J. O. Richardson, Peckham*	£698 0 0

* Accepted.

LONDON.—For the erection of No. 108, Fenchurch-street, for Mr. Trevers Trevers. Mr. Wm. Muskett Yetts, architect. Quantities supplied by Messrs. Franklin & Andrews:—

Hall, Beddall, & Co.	£16,640	0	0
J. Woodward	16,511	0	0
W. Downs	16,376	0	0
Colls Bros.	15,300	0	0
T. Boyce	14,783	0	0
E. Conder	14,766	0	0
Kirk & Randall	14,633	0	0
J. M. Macey & Sons	14,422	0	0
B. E. Nightingale	14,223	0	0
Holland & Hannen	14,120	0	0
Higgs & Hill	13,980	0	0
E. Lawrence & Sons	13,726	0	0
J. Morter	13,470	0	0
J. T. Chappell	12,968	0	0

LONDON.—For additional stablings, &c., to Studley House, Goldhawk-road, W., for Mr. Fred. G. Tautz. Mr. Chas. J. Gladman, architect:—

Richens & Mount	£612	0	0
Dove Bros.	575	0	0
Patman & Fotheringham	540	0	0
Thos. Nye	513	0	0
Joseph Dorey	503	0	0
Falkner	495	0	0

LONDON.—For alterations at Nos. 16 and 17, Wormwood-street, for Messrs. Crout & Co. Mr. Fred. C. Kettle, architect. Quantities by Mr. S. B. Wilson:—

First Estimates.

Brass & Son	£687	0	0
Mark Patrick & Son	675	0	0
J. Godfrey & Son	638	0	0
J. Harvey	611	18	6

Amended Estimates.

J. Harvey	435	0	0
J. Godfrey & Son (accepted)	431	0	0

NOTTING-HILL.—For building a steam laundry at Notting-hill. Mr. Josiah Houle, architect, Guildford-street, Russell-square:—

T. Wontner Smith & Son	£3,189	0	0
Macey & Sons	3,105	0	0
C. F. Kearley	3,097	0	0
Spencer & Co.	3,070	0	0
Outhwaite & Son	2,973	0	0
Patman & Fotheringham	2,973	0	0

Amended Tenders.

Outhwaite & Son	2,943	0	0
Patman & Fotheringham	2,938	0	0

Machinery and Laundry Fittings.

Bradford & Co.	1,954	0	0

OXFORD.—For the supply and erection of iron Gothic roof, and columns and galleries, &c., for the Anthropological Museum, Oxford:—

Gardner, Anderson, & Clarke	£1,047	0	0

RAMSGATE.—For certain alterations to fixtures and shop-front, at No. 40, High-street, Ramsgate, for Mr. G. Wellden. Mr. E. L. Elgar, architect:—

W. H. Port	£135	0	0
B. J. Cowell	115	0	0
H. Miller	114	0	0
W. W. Martin	112	0	0
J. Elgar (accepted)	110	0	0

SILLOTH.—For the supply and erection of the whole of the cast-iron columns and other cast-iron work, for new grain warehouse, for the North British Railway Company:

Gardner, Anderson, & Clarke	£1,006	0	0

STAINES.—For alterations to Mr. Cox's shop, High-street. Mr. Ralph Fitt, architect, Staines:—

Baker, Staines (accepted)	£200	0	0

STRATFORD.—For works in connexion with new counting-house, Broadway, Stratford, for Mr. J. R. Roberts. Mr. J. Kingwell Cole, architect. Messrs. Battam & Co., surveyors, Mount-street, Grosvenor-square:—

G. J. Hoaking, Upton-lane	£765	0	0
Williams & Son, Thornhill-square	757	0	0
Macey & Sons, Strand	695	0	0
Wall Bros., Kentish-town	625	0	0
J. Morter, Stratford	59)	0	0
Palmer & Co., Old Gravel-lane	545	0	0

WALTHAM ST. LAWRENCE.—For alterations and additions to The Grange, Waltham St. Lawrence, for Mr. H. Franklyn. Messrs. Cooper & Sons, architects, Maidenhead:—

C. W. Cox	£555	0	0
Hann & Co., Windsor	449	0	0
Silver & Sons, Maidenhead	417	0	0
Bottrill, Reading	416	10	0
Margetts, Reading	389	0	0

WEST WICKHAM (Kent).—For the completion of two shops at West Wickham, Kent. Mr. G. St. Pierre Harris, architect, Basinghall-street. Messrs. Baxter, Payne, & Lepper, surveyors:—

Crossley	£139	0	0
Lay	135	0	0
Taylor & Son	118	0	0
Jones	101	0	0

WEST WICKHAM (Kent).—For the completion of five houses at West Wickham, Kent. Mr. G. St. Pierre Harris, architect. Messrs. Baxter, Payne, & Lepper, surveyors:—

Jones	£391	0	0
Taylor & Son	291	0	0

WEYBRIDGE.—For proposed residence and stables at St. George Hills, Weybridge, for Miss Milligan. Mr. G. A. Wright, architect, Westminster-chambers:—

Brown, Weybridge	£4,281	8	8
Adkins, Surbiton	4,077	16	0
Holloway, Battersea	4,004	0	0
Ward, Portsmouth	3,912	0	0
Bottrill, Reading	3,860	0	0
Woods, Weybridge	3,525	0	0

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., *not later than Four p.m.* on THURSDAYS.

TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

J. C. B.—R. A. H.—H. H.—W. J. E. H. (should be glad to see the plans of the concrete building referred to).—J. R. W.—C. E. T.—E. L. F.—E. J. L.—L. G. R.—G. W. (next week).—J. C. (amount should be sent).—J. W. (ditto).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under .... 4s. 6d.
Each additional line (about ten words .... 0s. 6d.

Terms for Series of Trade Advertisements, also for special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.

FOUR Lines (about THIRTY words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to

DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office,* 46, Catherine-street, Covent Garden, W.C. *free of charge.* Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

Best Bath Stone, for Winter use.
WESTWOOD GROUND,
Box Ground,
Combe Down,
Corsham Down, and Farleigh Down. { Summer / Dried.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

Box Ground Stone
is the best for use in all exposed positions being a well-known and tried Weather Stone.
50,000 ft. cube in stock.
PICTOR & SONS,
BOX, S.O., WILTS. [ADVT.

Doulting Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [ADVT.

Doulting Free Stone
HAM HILL STONE,
BLUE LIAS LIME
(Ground or Lump),
For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [ADVT.

EVERY DESCRIPTION OF SEASONED WOODS AND VENEERS IN EXTENSIVE QUANTITIES.

B. J. HUDSON & SONS,
Millbank Sawmills, Grosvenor-road, S.W.;
Whitfield-street, W.;
And Store-street, London, W.C.
Telephone No. 3,152, and Private Wire connecting Business Premises.

MICHELMORE & REAP,
Manufacturers of
CHARLES COLLINGE'S PATENT
COLLINGE'S PATENT HINGES,
LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
and IMPROVED GATE FITTINGS of every Description
36A, BOROUGH ROAD,
LONDON, S.E.
DISCOUNT TO BUILDERS.

BRABY'S PATENT GLAZING.

GLASS SET FREE,
ALLOWING EXPANSION AND CONTRACTION, AND PRECLUDING BREAKAGE.
ABSOLUTELY WATERTIGHT. PAINTING AND PUTTY SUPERSEDED.
OVER THREE MILLION FEET FIXED.
DRAWINGS AND PRICES ON APPLICATION.
MODELS AND SECTIONS ON VIEW.
LONDON: 356 to 362, EUSTON ROAD.
LIVERPOOL: 6 and 8, HATTON GARDEN.
GLASGOW: 335, ARGYLE STREET.